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ABSTRACT

A proposed Outdoor Education Conference and Service Complex in Raleigh County, West Virginia, that will offer opportunities for an outdoor education program closely correlated with classroom activities is discussed in this document. The site is described, and suggested units for study during the resident program for 6th-grade pupils are presented in the areas of language arts, life science, mathematics, social studies, astronomy, earth science, music, and physical education. Information concerning the development of a school museum is also provided. (PS)

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OUTDOOR EDUCATION: CONFERENCE & SERVICE COMPLEX

Route 66
Daniels, West Virginia 25832

[1970]

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INTRODUCTION

An outdoor setting provides a laboratory situation for many curricular areas and presents an environment highly conducive to accurate perceptions, vivid factual associations, intense freedoms, and pleasant sensual associations.

> "Outdoor education and camping are not frills to be scalloped around the curriculum. In the woods, fields, and streams children can see, feel, hear; they can even smell and taste. Here reality, with all its vividness, becomes both motivation and method for learning."[1]

The Raleigh County Board of Education proposes to operate an "Outdoor Education: Conference and Service Complex" that will offer opportunities for an outdoor education program which will be closely correlated with classroom activities and which will become an extension of the classroom. The complex will also offer in-service training for the teachers of the county schools and make available various materials for classroom use by the teacher and students.

The tract of land available for development and use this complex offers unlimited opportunities. It is located near the geographical center of Raleigh County and within easy access of all schools. Its natural beauty is conducive to the development of the aesthetic qualities that should be developed by the users in a comprehensive program of outdoor education. There are two areas within the boundaries of the tract where rocks have been quarried that are "naturals" for the study of geology. The terrain is such that demonstration activities in conservation can easily be developed, and the site is far enough removed that city lights and air pollution will not interfere with the study of astronomy.

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[1] Julian W. Smith, "Education Goes Camping," THE SCHOOL EXECUTIVE, 68:45, September, 1948.

Over 60 acres of woodland is available which has an abundance of the flora of West Virginia. Many plant species not generally native to the county are found within the confines of this area. Many of the smaller animal species (particularly birds, reptiles, and amphibians) which can be studied in classes of field zoology can also be found here.

Little Beaver Creek flows through the property, and the property is adjoined by Little Beaver Park which has a 50 acre man-made lake. These provide opportunities for more activities in the biological sciences and will serve as potential sources of materials to be utilized by the service center. The lake will also be available for activities such as fishing and boating.

The curriculum materials contained in this publication are suggested units for study during the resident program for sixth grade pupils. To effectively use these or any others the teacher and pupils should decide which unit they will utilize and plan accordingly. Included in the planning will be a pre camp period of study (of at least a week), the camping experience, and then a follow-up study and evaluation of the experience when the pupils return to the classroom.

During the pre camp work and during the follow-up one or more members of the Outdoor Education Staff will be available to visit the classroom and assist with the unit selected for study.

CURRICULUM COMMITTEE

James K. Lowry, Director

Jack Covey

Buford Hartsog

Dix Manning

Lou Manning

Jack Patton

John Seay

Zettie Stewart

Frances Sturgill

Fred Williams

Helen Wirtz

Concepts

Using the Five Senses in writing an Outdoor Adventure.

Sub-Concepts

Learning is more than seeing and hearing. Relating the use of one sense to the uses of some of the others to make a more thorough investigation.

Procedure

Review how learning comes from reading books. Experiment with sound only by tapping or dropping various objects while children eyes are closed to see if they can identify them by sound only. Uncork various unlabeled bottled odors and see if they can identify the contents by smell only. Let them feel various objects enclosed in a box with only a small hole for their hand to enter to see if they can identify by feel only. Now get ready for a field trip. Give each student five pieces of paper or let them use five pages of their field notebook. Head each one: Labeled; (1) We saw (2) We heard (3) We felt (4) We smelled (5) We tasted, Taste only under supervision. Let them make notes as they go along. Make as many observations as time will permit. Encourage the pupils to use their own observations and not to rely on someone else for their notes.

Materials

Various sizes and shapes of objects; cup, book, box, kinfe, spoon, pencil, etc. Numbered bottles and jars for the odors you will use. (Be sure you know the contents of these.)

Box with a cover and small hole. (In the side preferably for your feel objects.) You may think of others to use. Note pads or sheets of paper for each student. Pencils.

Investigation

Let the pupils write down their experiences and observations as they proceed on their trip. If any seem to be having trouble the teacher can make a few suggestions.

Maybe some could work better in a group with one recorder for the group. Teacher--the route should be selected beforehand for as many experiences as possible. Pupils--observe a few changes in feel and odor by crushing some odorous substances like spice wood for instance, or the taste of sourwood leaves, or birch twigs, etc. (Berries of staghorn sumac.) Walk on a bed of dry leaves or damp moss. Sit on a stone without moss then sit on a moss covered stone. Feel of a dry piece of wood then feel of one that has been dipped in water or better use on that is lying in the water. Make a record of your findings. Write a report for the Bulletin Board. Perhaps you would like to make a "What is it" label. Using various harmless odors for the other classes to smell, and identify.

Extension

The Field Trip should be used for a written assignment. Making charts either for the Bulletin Board or for class Charts, Science, Social Studies, Health, Poisonous and Non-Poisonous plants.

Reference

Edible Plants, West Virginia University; Nature Education Department

Nature Bulletin, West Virginia University; Nature Education Department

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row, p. 32

Evaluation and Addendum

Write or make an oral report on your notes inserting some very descriptive words telling of your various sensation experiences. Do the children have a pronounced awareness of the senses? Are they willing to make investigations and observations? Do they seem to want to share their findings?

A committee might make up a class Trail Chart and locate on the Chart where they stopped to listen, see, feel, taste, or smell and with colored pins, (map pins) make a legend of their trip.

Concepts

To give directions clearly and accurately.

To organize facts and ideas.

To explain clearly.

Sub-Concepts

To ask concise questions.

To give accurate and adequate answers.

Using reference books to gain some specific knowledge.

Procedure

For Teacher

Choose one student to be "It". Send him from the room, (If you are meeting outdoors blindfold him). While he is out have another member of the class hide an object. (Not too well.) Call "It" back in, or remove the blindfold. Tell him what object you have hid and that he must find it. Also, tell him that the rest of the class if going to give him directions how to find the hidden object. As he starts looking have the others to sing "The Bear Went Over The Mountain". They are to sing softly until he is getting close to the hidding place, the closer he gets the louder they sing, the farther away he wanders the softer they sing. Do this until he locates the hidden object. Now, explain that it is improtant to give accurate directions for any activity. And that directions for getting to a certain place must be clear and concise. Another good activity is: Give each student a piece or paper (plain or ruled) with the words North (top) East (right side) South (bottom) and West (left side) written on it. (They can write it on their paper themselves.) Now give a good descriptive set of directions of how to get from where they are to some place on the complex, say "The Dinning Hall". Have them draw and label each tree and other identifying objects you mention as you give them the directions. Be sure to mention the terms on the sides of their paper so they can draw in the road as they listen to you describe how to go there. Post their finished maps on the Bulletin Board.

Materials

Different Language Arts Text Books.

Encyclopedia or Other Reference Books.

Pencils and Paper.

An object to hide.

A blindfold if class is outside.

Investigation

Pupils

Give orally, a set of accurate directions to get to some certain place in or around the camp. (Maybe to the Council Circle).

Tell how to make:

A flower print
Cookies
Fudge Candy
Popcorn

A leaf press
A collection of some kind
Tell how to do a science experiment
Tell how to catch a butterfly, etc.
(Net and all)

Look up in a reference book how to do an experiment and write it up.

Get the cook to give you a recipe on how to cook something you like for dinner. Write it for the class. Make an informal outline on some game to play. Teach it to the class using your outline.

Extension

Making an outline for a science report.

Making and using an informal outline for oral reports.

Keeping steps of an activity in their right order.

Game file for stunt or party night.

Keeping an orderly notebook for classes other than Language Arts.

Reference

Modern English In Action, P. 93-98 Christ (Author) Heath (Publisher)

Curriculum Enrichment Outdoors, P. 35 Hug and Wilson, Harper and Row

Evaluation and Addendum

An awareness of the need for accurate and concise directions. Using terms like North, South, Right, and Left instead of this way and that way. Keep a notebook or an informal references on all your field trips for future use.

Be able to give directions for another to use to get to some place of unusual interest.

Concepts

Using poetry in outdoor experiences. Make a ballad to tell a simple story.

Sub-Concepts

Experiencing the rhythm and rhyme of ballads.

Working with a group to produce an original story in verse.

Procedure

Teacher:

Since the ballad stanza is one for the easiest to write and lends itself to humor and drama the pupils will enjoy listening to you read a few. Talk about the typical ballad how that lines 2 and 4 of the stanza rhymes. Too, the lines 1 and 2 can rhyme.

The rhythm is usually: (Line 1) Tum ta Tum ta Tum ta Tum (Line 2) ta Tum ta Tum ta Tum (Line 3) Tum ta Tum ta Tum ta Tum (Line 4) ta Tum ta Tum ta Tum. Give them some examples. Give some first lines and let them write three original lines to go with the first.

Examples:

1. My father turned and said to me.
2. The leaves were dancing in the sun.
3. The student's life is never dull.
4. The hill path is steep and long.

Those who prefer may make up their own first line, but just make sure 2 and 4 rhyme.

Now that they have the "Hang" of ballad construction let them make a story of an outdoor adventure.

The following one is taken from Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row P. 44

"Once upon a bright spring day.
A class set out to find
How birds could build their nests
And plan a home design.

A stop was made to watch a wren
As in and out she flew
Carrying twigs and grass each time
To make a nest that's new.

The robin had his nest begun;
'Twas mud he needed for the fill
So down in the dirt he hopped
And carried mud up in his bill."

Let the class work independently with very little direction from you. Sing or play a record of a ballad "Barbara Allen", "Get Up and Bar The Door". "Casey Jones", "John Henry" or "The Mariners Lament".

Materials

Paper, pens, or pencils.
Song books with ballads in them.
Books of Ballads.
Record Player.
Album of Ballads.

Investigation

Pupils:

Read and listen to ballads. Write a 4 line ballad. Find references to ballads in Language Arts Books, also in Readers. Run reference on ballads and ballad writers in a good reference book. (Billy Edd Wheeler is a native of West Virginia. He is famous for his ballads about the Coal Miner and life in the mining town.)

The class working as a team can start with a good first line and write a story in ballad form of some camp activity. Each member should contribute at least one line. Take turns reading or singing ballads. Maybe someone brought his guitar to camp if so play and sing some ballads for an assembly.

Extension

Science: Write up a science experiment in ballad form.

Music: Set your original ballad to music.

Nature Study: Write a ballad of an insect or animal, or perhaps the largest tree on the complex.

Reference

World Book Encyclopedia

Modern English In Action, P. 198 Christ (Author) Heath (Publisher)

Curriculum Enrichment Outdoor, Hug and Wilson, Harper and Row

Folk Music Album #2 Billy Edd Wheeler

Evaluation and Addendum

Let students choose a poem or story and put it in ballad form.

Let a committee give a report on the history of the ballad.

Have them learn a ballad to sing for an assembly or at the council fire.

Sing a ballad that has speaking parts for men and women. The girls speaking the woman's parts and the boys speaking the man's part. Invite a Ballad Singer to visit the class.

Concepts

Building an Outdoor Vocabulary.

Sub-Concept

Nouns-adjectives-other parts of speech.

Dictionary use to identify parts of speech.

Procedure

Use a quiet period in an outdoor activity to list types of sounds or noises heard, (creek, crash, squawk, buzz, etc.) Then use a word to describe the sound like faint creaking, harsh squawking, loud crash, etc.

Name four or five objects that can be seen and make a list of as many adjectives describing their size, shape and texture as you can, such as rough bark, gravel path, rocky hill, etc.

Suggest that each keep a list of the words for future use.

Take some objects, say a pebble, a leaf, or some moss, and have the group make a list of words and phrases describing shape, size, color, and texture of it.

Materials

Pen or Pencil, small note pad and carrying envelope, or clip board.

Investigation

Use several quiet stops to give the pupils a chance to give a descriptive sentence or some heard sound or seen object along the trail. If this lesson is in the classroom relate it to objects in the room, and sounds from the outside. Too, let them feel some given object and describe how it feels.

Extension

Spelling and Dictionary use.

Original stories for assembly or vespers.

Reading and Vocabulary extension.

Build a class dictionary of the new words. Appoint a recorder and committee to help put all of the words in alphabetical order or list all nouns, adjectives, and other words under the right title.

Reference

Curriculum Enrichment Outdoor, Hug and Wilson, Harper and Row

The Teaching of Writing in Our Schools, Corbin, MacMillan P. 25.

Evaluation and Addendum

Pupils volunteer an oral sentence using colorful words to describe some object, bird, or animal.

Let them present them to the class, or, if they are shy, let them choose one who will want to present them.

Play a word game in which the new words can be used.

Concepts

Listing and learning the names of the birds common to the area.

Bird names of one syllable like wren.

Bird names of two syllables, such as, Cucoo.

Bird names of three or more syllables, such as, Cardinal.

Bird names of compound words, such as, Blue Jay.

Bird names of hyphenated words, such as, yellow-shafted Flicker, Rose-breasted Grosbeak.

The bird or birds with the longest name or names, such as Ruby-throated Humming Bird.

Sub-Concepts

Seeing the name written, writing it, seeing yourself write it helps to insure good spelling.

Making Bird sounds (Imitating sounds that birds make).

Procedures

A list of the birds in color around the room. If taught outside a portfolio of the bird pictures. Also pictures of nests and eggs will help.

Play a record of bird calls show some slides of birds.

Talk about the birds common to the area. Go out into an open area and watch for birds feeding. If there is a bird feeder on the ground, visit it. Take a short walk to locate birds at home.

Take one special bird and learn about it. Then read or tell about it to the class. Try to choose one other than the Cardinal. Use the Cardinal for special assignment for the class.

If the lesson is in the fall or winter try to have some abandoned nests to show and for the pupils to see and feel.

Materials

A bird chart of birds common to the area.

An Electric Bird Board, borrowed from the nature room.

Portfolio of rather large bird pictures.

Box of know your bird flash cards.

Recorded bird calls.

Note pads or clip boards, pencils.

A good book about birds for reference.

A number of the pamphlets.

A LIST OF 101 SUMMER BIRDS OF WEST VIRGINIA

The Appalachian Center Cooperative Service, W.V.U. Pub. 193

Mimeographed sheets of the bird game described in evaluation and addendum.

Use a full size sheet of paper or put two on one piece and cut them in two. If you do this put the directions on each half.

Investigation

Give the pupils free time to brouse around.

Have them seated and quiet for Bird Call records. Silently show the bird pictures while it is calling. If the bird has more than one call acquaint them with that fact, also take the children on a short walk in the open area. Let them record all the birds they see and determine if (it) or (they) are winter or summer birds in the area.

Have them choose one bird and write or tell orally its name, color, other identifying data about it. Tell what it eats where it lives, how it builds its nest and out of what, how it feeds its young and what it feeds them.

Make a special assingment for the state bird.

Have one student as recorder and post on the bulletin board the home of the ones seen and make a record of the most birds.

Extension

Biology

Science

Conservation

Hobby: (Bird watching collecting)

Spelling and Reading

Charts and Records

Music (should be first)

Games

References

A List of 101 Summer Birds of West Virginia, The Appalachian Center, Cooperative Service, West Virginia University, Misc. Pub. 193

Flash Cards Knowing Birds, J. S. Latta's

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

Nature Bulletin, Nature Education Department, Oglebay Institute, Wheeling, West Virginia.

Evaluation

If recorded bird calls can be isolated give a test on bird calls by letting pupils listen and write the birds name. Insist on correct spelling.

The test could be conducted orally by having the ones who think they know the birds name raise his hand and give the name. Don't make the list too long. Use the flash cards and have the pupils write the name of the bird in the picture, or read a short description of the bird and let them identify it. Let the pupils play a game, I'm thinking of a bird. The others guess the bird by asking questions such as, Is it red, etc. Try to get the right answer before you use your five questions.

Play this bird game.

T	L	W	R	I	N
N	O	I	H	O	B
C	R	L	P	E	V
S	E	T	L	N	W
G	O	A	B	U	A
I	C	K	R	D	L

Can you find birds in these squares? You can find them by beginning with any letter and moving in any direction (up, down, across, diagonally) to spell a birds name. No boxes may be skipped, but letters may be repeated as needed. There are more than 20 birds, write their names in the margin.

Concepts

Stop, look, and listen. To observe carefully, listen attentively, to make reports accurately.

Sub-Concepts

Develop good audience habits. Discussion groups on audience participation.

Procedure

In an outdoor activity encourage the students to practice good listening habits. Have a pre-arranged signal for silence and attention. The upraised hand is a good signal. Halt the group by raising the hand and saying stop, look, and listen. See that no one talks or walks on while you pause.

When you first stop ask the group to close their eyes and hands. As they stand quietly opening a hand, one finger at a time as they hear a sound. Tell them to try to remember the sound so they can report at the end of a few seconds of listening.

Now everyone opens his eyes and report each sound they heard. If anyone heard a sound they couldn't identify maybe they can imitate it for the benefit of the others.

Make two or more stops for listening and looking, trying, to see if the source of sound might be two branches rubbing together.

Materials

Note books, pencils, keen ears and eyes.

Investigations

Make a baby bird sound by kissing audibily on the back of your hand. This usually disturbs the adult birds until they will come quite close.

Part of the class close their eyes while the others do something that make sounds like scuffing foot on the path, sliding a grass blade through the fingers, breaking a twig, etc.

Let the others hold up the finger if they think they know what made the sound. The winner being the one who got the most answers right.

Extension

Music - Example: Record from soundtrack of movie, Hatari. Let pupils identify sounds, also good for creative writing.

Art

Science

Developing good listening habits. Making close observations.

Reference

Modern English in Action, p. 46, Christ (Author), Heath (Publisher)

Curriculum Enrichment Outdoors, p. 23, Hug and Wilson, Harper and Row

Evaluation and Addendum

Keeping a note book on daily observations.

Keeping a list of descriptive words used in describing sounds and sights.

Write an original story about the most beautiful thing on the complex.

Write an original rhyme about the most unusual tree you saw.

Write or tell orally a story about what one tree has seen and heard in one day of its life, or write about how it withstood a storm.

Concepts

Reporting: To learn how to prepare an interesting, informative report and to learn how to present an interesting, informative report.

Sub-Concepts

To learn outline form to share your learning experiences with others.

Procedure

Give the class the report on how the state bird, tree and animal were chosen, West Virginia Blue Book. Post an outline on the Bulletin Board. Here is a good one taken from Modern English in Action, page 221.

Learning about seed plants

I. Great importance of seed plants
  A. Kinds of seed plants
    1. Over 150,000 varieties
    2. Many types
      a. Trees and shrubs
      b. All group plants and vegetables
      c. Garden and wild flowers
      d. Grasses and weeds
  B. Products from seed plants
    1. Wood
    2. Paper
    3. Cotton
    4. Linen

II. Variation in size of seed plants
  A. Tiny floating duct weed
  B. Giant sequoias

Stress on how to number an outline for a good report.

Give the class a list of resources from which to find materials for a report. Make up small groups of students of not more than four to each group. Let them appoint a recorder. Give them a specific assignment to prepare a report for. Since the state tree, flower and bird can be found within the complex maybe the reports could be prepared for these. A report could be made on the hard wood trees of the complex. Another could be made on the cone bearing trees of the complex. And too, the students might want to choose their own favorite subject. If so, let them.

These should be written up for a class book to be represented to the library for future use.

Materials

Paper and pencils.

References

West Virginia Blue Book, West Virginia State Department

Nature Bulletins of West Virginia

Investigations

Make a comprehensive outline of your subject.

Write your report even if you are going to present it orally. (Remember you find information in reference materials but you write your own outline and sentences.)

Work with your group to prepare your materials, then choose one from the group to give the report.

Take a walk to observe the subject you have selected.

If your group selected cone bearing trees when your report is given, make a nice display of the various cones collected and have each labeled. If your group chose the sugar maple, if it is possible have a sample of products from this tree to show with your report.

Extension

Scientific papers

Science collections

Soils and conservation

Original stories and poems

Bulletin Boards

Class books for the Library

Art

Reference

West Virginia Blue Book

Modern English in Action, p. 219, Christ (Author), Heath (Publisher)

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

Nature Bulletins, Nature Education Department, George Brieding (Author), Oglebay Institute (Publisher).

Evaluation and Addendum

Is the student able to give a book report either written or oral? Does he approach a report with confidence?

Do students willingly offer to look up information, or volunteer to get information from other sources like interviewing resource people?

Science Bulletin Board.

Concepts

Writing Bulletins and News Items

Sub-Concepts

Bulletin Boards, Class Newspaper, School Paper, Newspaper (Daily)

Procedure

Bulletin Board Display; News Items cut from the Newspaper or School News, Camp News, etc. General discussion of Rules for such items.

The Bulletin Board assignment may be a group project. Make a list of related items to be presented and let the pupils write them up for posting.

Discuss news worthy stories and announcements.

Make individual assignments, try to involve all of the class. Have each person to sign his work so he can be given credit. Everyone gets a thrill out of seeing his name in print.

Materials

Blank poster paper.
Magic markers.
Reference books.
Note pads.
Pencils.

Investigations

Find and study as many Bulletin Board plans as possible, choose a subject that is timly. Make observations that are relative to the area or camp. Let the students make a "Did You Know?" Bulletin Board. Such questions as "Did you know that trees have flowers?" This is a good time to see _______ in bloom. Mention where it can be found. "Did you Know?" there is a dogwood with purple berries? They should give the name of a reference book with a page number telling about this particular tree. Maybe each student could contribute a "Did you Know?" item.

Write one paragraph items of information on flower or plants found on the grounds, or of birds living here.

Write news items of Resource People visiting the complex.

Write news items of the activities taking place during the week for the local paper.

Extension

Factual information to be used in other classes, science, social studies, or math.

Individual papers to be presented at an assembly period.

Necessary announcements of events and happenings to take place.

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

American Language Series, Hosic-Hooper

The Teaching of Writing in Our Schools

Corbin MacMillan Page 24

Evaluation and Addendum

Write quick news items. Write an announcement giving all necessary information. Make an oral announcement to, or for some other group other than your own class. Give a factual "Did you know?" either from personal observation, or from a reference book.

Concepts

Language Game of Pronunciation

Sub-Concepts

Drama; Oral Reading; Coral Reading

Procedure

Read or otherwise present to the class some tongue twisters. Try to have at least one that is real funny. Then read the following sentence slowly and carefully: "Round the rough rocks the ragged rascals ran." Now let the pupils take turns reading the sentence. Now distribute copies of the following and let two pupils read it. One reading the question, the other reading the answers and all taking part in the last paragraph. Others will want to read it too. Let them. But be sure they strive for good pronunciation.

Q What did the ragged rascals do?

A The ragged rascals ran around the rough rocks.

Q Why did the ragged rascals run around the rough rocks?

A The ragged rascals ran around the rough rocks to reach the rutty road that ran to the rippled rill.

Q What is a rippled rill?

A A rippled rill is a very little river roughened with rills.

Q Why did the ragged rascals want to reach the rutty road that ran to the rippled rill?

A The ragged rascals wanted to reach the rutty road that ran to the rippled rill to roll in the red dust.

Q Why did the ragged rascals want to roll in the red dust?

A The ragged rascals wanted to roll in the red dust to render themselves raggeder, and raggeder, and raggeder.

All together: Oh, Yes the ragged rascals ran round the rough rocks to reach the rutty road that ran to the rippled rill to roll in the red dust to render themselves raggeder, and raggeder, and raggeder. That's why the ragged rascals ran.

Materials

A book that has some tongue twisters.

Some mimographed copies of the reading.

Some copies of other readings would be useful .

Tape Recorder

Investigation

Make this a fun experience for the pupils but observe carefully any pronouncing difficulty that anyone might have. Follow up with some private help if you feel the pupil will profit. Let pupils teach tongue twisters they might know. Maybe the others would like to write some of them for future use. The assignment be; to find other teachers or counselors that could give the class a new one. Or see how many pupils could write a short one of three or more words.

Extension

Reading and Phonics

Talent Night

Bulletin Boards

Challenges for stunt night

Just plain fun for the individual

Reference

Language series A Language Game--Hosic-Hooper p.78

Evaluation and Addendum

Is there a willingness to work in a group? Is there growth in word usage? Let pupils evaluate a learning from a lesson of this kind by carefully listening to the others. If possible let each use a tape to listen to themselves.

Concepts

Uses of and needs for oral language experiences.

Sub-Concepts

Locating Facts. Imparting Information. Oral Communication is Language Art.

Information gained from a resource book may not be enough.

Personal Interviews.

Procedures

Have names of trees and flowers, plants and minerals, etc. on strips of paper in a box or hat. One for each child. Have them draw one out by turns. Then you draw one from the box also, now proceed from a resource book to locate your plant tree, on rock and give a short history for it.

Maybe some pupil drew a name that he is familiar with. If so let him give an oral history of it. If his presentation isn't acceptable but his facts are true, make some constructive suggestions. Subtly, of course, present some colored pictures from books, magazines, or slides, giving a brief oral description of them.

Map out a short trail that has the various trees, plants, etc. selected by the pupils. Lead them along the trail and station each by his chosen organism. Arrange before hand for another class or a group of visitors to take the same trail.

Materials

Strips of paper with the selected names on them.

A box to put them in.

Note cards for each pupil (Large ones).

Pencils.

Reference books for plants, trees, rocks and whatever else have planned.

Pictures, magazine articles, slides and a projector.

Enough books and phamplets until each child can work independently or in very small groups.

Tape recorder.

Investigation

Write a brief history or legend of your chosen plant. Encourage independent work. (Don't worry about sentence structure or penmanship to much.)

Practice reading your card. (Station the pupils in sight of each other but not to close for their words to drown each other out.) Now that you are at your station you become that tree, plant or what have you. As visitors come by tell your lable and answer any questions the visitors may have as to growth habits, length of life, uses, etc. Later make a list of the questions you were ask. And if you did not know the answers to some of them find the answers.. Plan another living trial on your own.

Sample: Common Dandelion. This common weed, perhaps the most common in the state, came to us from Europe. The name Dandelion is derived from French, Dent de Lion meaning lion's tooth, which probably refers to the jagged edges of the leaves. The dandelion blooms in the state every month in the year. Some questions might be: What color are the flowers? Is it poison? What kind of seeds does it have? So have more information than just your label. If there is time let the pupils as they abandon the trail stop by the various plants to read the labels.

Extension

Soils
Conservation
Science
Geology

Native Plants
Forestry
Panel discussion for an assembly.
Illustrated charts.

Reference

Nature Bulletin No. 10, Nature Education Dept. Oglebay Park, Brieding or Bowles

Curriculum Enrichment Education, **Hug and Wilson, Harper** and Row, 33

Spring Flowers, W. Va. Department of Agriculture

Evaluation and Addendum

Did the pupils enjoy this experience? Were they shy with visitors? Encourage oral reports of their feelings. Make some illustrated charts for the Bulletin Board perhaps in color. Have an Oral Quiz on pupils findings. Observe their usage of words. Encourage them to learn to spell the terms and to learn some scientific names for the trees and plants. Maybe they would like to make a class booklet of their living labels with the picture of what each represented.

Concepts

Language Arts through Dramatization.

Sub-Concept

Acting out a fable, writing an original play, choosing characters, making conversation for stories without conversation.

Procedure

Read from a book of fables and legends, a short story. Let pupils volunteer to take parts of the characters in the story. Have someone be the reader and read the book part, and have the volunteers say their parts.

Short dialogues would be good practice, also use two or three sentence jokes from magazines. Too, conversation taken from a comic page with different students taking the various parts could be very amusing.

Let a group volunteer to read short stories from a primary storybook, Little Red Hen or Chicken Licken. Then let others take the parts and say the conversation. Be sure your selections pertain to the out-of-doors like the above mentioned. Now let the group compose their own legend or fable.

Materials

Book of Aesop's Fables, Primary Story Book, maybe some comic strips. Some short conversation jokes found in magazines, such as Progressive Farmer, Saturday Evening Post, etc. If possible mimeographed copies of this play from the fable the Fox and the Crow.

Scene 1: Crow with piece of meat flies into tree. Puts the meat down, puts her foot down on it and says: Well, I did that rather cleverly. The farmer was cutting up a sheep he had butchered; and while he went to sharpen his knife, I flew down and stole this piece of meat. I'm clever, I am. If I weren't so clever I never could get along in this difficult world.

Enter the Fox

Fox to himself

See that stupid crow. She has stolen a piece of meat. I wish I had it.

Crow to herself

There is the fox, I wonder if he knows how clever I am, how beautiful, and how well I can sing!

Fox: Good Morning Crow; that's a fine piece of meat you have won't you give me part of it.

Crow: Certainly not. Get your own meat. The farmer is butchering today.

Fox: Well, you'd better if you don't I'll climb the tree and take the meat away from you.

The fox makes a leap as if to catch the crow. The crow picks up the meat in her beak again.

Fox: Well, there now! I don't want to hurt you, or take the meat away from you. I was only fooling. Do you think I would do you an injury?

No, friend crow, I would not hurt or rob you. I would not injure one so beautiful, why the loveliness of you fills me with joy; and as for the fairness of your color it is far greater than any other creature. If it were not for your voice you would surely be queen of the birds. How can so beautiful a bird have such an awful voice, so harsh, so rasping, so like the noise of a power saw?

Eager to show how well she can sing:

Crow: Caw, caw, caw.

The meat falls.

Crow: Angrily! Caw! Caw! Caw!

Fox: Your voice isn't so bad friend crow, but as far as brains--well, I never knew anyone more stupid.

The fox picks up the meat and exits.

Investigation

Notice that some ideas have been added to the play. The writer of the play tried to think just how the Fox and the Crow would talk. Take one story you would like to turn into a play and think just how the characters would talk. Get a group to help put it in form for the rest of the class.

Dramatize actions outdoors.

Play a verb relay. (Teacher) Divide the group into smaller groups of five or six people. Have a captain for each group. (Pupils) Let the captain draw from a box, verbs like run, jump, hop, crawl, leap, etc. one for each player. They in turn must perform their action from a given point to a set goal and back. The first group to finish is declared the winners. Make other lists of verbs that could be used in Language games. Write up the games and teach them to other groups.

Extension

Games for party night.
Games for Contests.
Challenges.
Reading and phonics.
Social Studies.
Physical Education.
History.

Reference

American Language Series, Hosic-Hooper, p. 187

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

Evaluation and Addendum

Use original plays for evaluation. Observe if pupils are able to interpret meanings of certain words. Develop ability to make suitable selections to use in classroom dramatizations. Make some games and stunts suitable for playground stunts, and party night. Make a good fable for a vesper program.

Concepts

To be at ease in a group through being able to introduce people properly and graciously; to be able to introduce yourself and interview prominent persons.

Sub-Concepts

Making Introductions.

Writing Interviews.

Factual information and organization of materials.

Procedure

Pictures on Bulletin Board portraying pupils making introductions.

Introduce an invited guest or resource person to the group.

Talk about courtesy introductions.

If you have puppets available, give the pupils who will volunteer a chance to make some introductions (even if the puppets are animal characters).

Have a student prepare to interview an invited guest or resource person beforehand. (Even if you have to prepare the questions for the pupil to use.)

Have the pupils to make a copy of pertinent interview questions.

Post rules for both intorductions and interviews on the bulletin board.

Materials

Note pads and pencils or clip boards.

Space for a formal setting either outdoors or inside.

Identification tags for trees, plants, animals and flowers common to the area.

Four boxes.

1 with name tags of animals.
1 with name tags of plants.
1 with name tags of trees.
1 with name tags of flowers (no more than six names in each box)

On the back of each name is to be a few short sentences about each name, these to be used as answers in an interview.

Each category of names to have a card which can be used by the speaker in the introduction.

Investigation

Let the pupils make groups of three. One is to be the speaker and will introduce the other two. They have chosen name tags from one of the boxes and assumed that names identify. The speaker has the appropirate category card with pertinent information on it.

Use only as many cards as you have pupils.

Now have the ones with the introduction cards pretend to introduce the different (say plants) guest speakers, and let the guest speakers pretend to introduce themselves to the audience (the pupils) using the sentences on the back of their name tags, or: Use these sentences as answers in an interview after the speaker is introduced or: Given more time, each animal, plant, flower, or tree could look up some facts concerning himself to be used in an interview. The students are to make both the questions and the answers for this assignment.

This could be a very enjoyable learning experience. Most pupils are rather shy when it comes to introductions and personal questions, but most like to pretend.

Extension

Reading
Social Studies
Biology

Spelling
Using reference materials
Games

Reference

Nature Bulletin, Nature Education Cooperative Department, Oglebay Institute Wheeling, West Virginia No. 27

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

Evaluation and Addendum

Have children write an interview for some particular plant or animal, writing both the question and the answers.

Make an introduction either for imaginary objects or for real people.

Let the less timid introduce an invited guest or speaker.

Let them make a short self introduction either real or imaginary.

Let the ones who will volunteer make some personal interviews of other teachers or resource people in the camp. Let volunteers introduce resource people and invited speakers for assembly.

Concepts

Protraying Pioneer Life

Sub-Concepts

Dramatize an original Pioneer story or use one from a book. Show the work and pleasures of all members of the family.

Procedure

This lesson setting should be in the pioneer cabin at the complex or at least in the front of it.

Let the students famılarize themselves with Pioneer household goods and furnishings. Using the authenic articles if possible. If this isn't possible use some copies. A very enterprising class if alerted before time could borrow furnishings to use.

Assign parts for each one in the class. Those who won't want a speaking part can help with stage and other chores.

If there is any one of the families of the students that own some colonial clothing have it on display. Maybe some of the Home Economics classes in the County would make costumes for a play to become property of the Language Arts Class.

Read or tell a number of Pioneer stories, depicting all kinds of activities in their lives.

A colorful square dance might be a good activity to dramatize.

Materials

Pioneer stories.

Some artifacts of the Pioneer life.

Some Colonial clothing; quilts, etc.

Some authentic copies of Pioneer clothing for girls and boys.

Investigation

Read and talk about Pioneer life.

Try to imagine Pioneers' living on the complex and farming the land, fishing in Little Beaver Creek and hunting in the woods around the area. Tell some imaginative stories about some of them.

Find some recipes for Pioneer cooking. Write a cook book of them. Ask grandma's about anything they may remember from their younger days. Make a list of foods that were cooked on the fire. Tell how bread was baked.

Extension

Dramatization
Assembly
Stunt Night
Play Night
Calling figures for a square dance.

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

Evaluation and Addendum

Putting on a play for an assembly.

Putting together a Pioneer Cook Book as a class project.

Perhaps the classes who use the complex the first year would like to take for a project the restoration and furnishing of the Pioneer Cabin on the Complex.

Concepts

To increase ability to find answers to unrelated questions. To increase the ability to read between the lines to find the authors intent. To understand hidden meaning and thoughts.

Sub-Concepts

Information is where you find it. Make your collection from a number of sources.

Procedure

This is going to be a fun lesson with some very definite learning experiences. Distribute to each member of the class a mimeographed sheet of paper with the following list of question on it. Also, furnish each one with a mimeographed list of Partial Vegetation List of Raleigh County 4-H Camp June 12, 1967 by William N. Grafton. If you don't have enough for each other to have a list divide students into groups and give a copy to each group.

They are to answer each question with a name selected from one of the three groups on the list.

What is the name of the following:

1. Wearing Apparel? (Example: Lady's Slipper)
2. A poisonous repitle?
3. A girls name?
4. The pure colors?
5. Something for a seamstress?
6. Four condiments?
7. A bird?
8. Equipment for medieval soldier?
9. A racer's hopes?
10. The wisest of men?
11. Ill mannered procedure?
12. The burning bush?
13. A halloween character plus a girls name?
14. A dried fruit?
15. A part of a animal?
16. Portion for Socrates?

You might want to put the answers on your paper. If so, here they are:

1. Lady's slipper
2. Rattle snake plantain
3. Violet or Witch hazel, etc.
4. Northern red oak, Blue-eyed grass, yellow poplar or yellow Wood Sorrel
5. Pincushion Moss
6. Wild Sage, Coltsfoot ginger, cinnamon fern, winter green
7. Partridge berry
8. Shield fern
9. Speed well (Common)
10. Solomon's seal
11. Interrupted fern
12. Flaming Azalea
13. Witch-Hazel
14. Wild raisin
15. Colt's foot ginger
16. Hemlock

Materials

Mimeographed lists of the questions.

Mimeographed lists of the plants.

Paper and pencils.

Investigation

Have the class go on a walk using a trail along which you will find some eight or more of the plants that were answers to the questions. Have them consult their list for the scientific names of the plants. Have them learn to spell both the common and scientific for at least a dozen of the plants.

Let them make them a list of questions with plant names for answers, and exchange with each other.

Post the list that has all the answers right along with the winning students name.

Maybe some of the class will volunteer to look up some of the flower names to see what country they migrated from to the United States. Any good flower book will give this information.

Extension

Reading and spelling science.

Reference material

Biology

Reference

Flora of West Virginia, West Virginia University, Dr. Core

Partial list of plants Raleigh County 4-H Camp, By: William N. Grafton

Evaluation and Addendum

Scrapbook of trees, shrubs, and plants prepared for the Science and Biology Lab.

Specimens preserved by drying and pressing for display.

Concepts

Using reference books for a specific assignment.

Sub-Concepts

To become familiar with reference books. To learn to use a book to find facts. To learn how to find answers in various kinds of reference works.

Procedure

Working with a class outdoors affords an excellent place to teach the use of all kinds of reference materials. Present some facts about a number of plants, flowers, trees, and places of interest close by or within the complex. Prove your statements by using a reference book. Have a student use any reference book at hand to locate some specific information. World Almanac, Information Please Almanac, or even a good dictionary. Now plan a short field trip with the class. Before you start mention some of the plants, etc., you are going to see. Have each student carry a note pad to make some notes about each plant, and other things, along each to look up later. Don't make the list too long. You might want to assign a different plant tree or flower to each class member to find information about. Perhaps you will see something on the field trip you hadn't anticipated. If it is of interest, a land turtle, a reptile, a bird, a kind of insect, a stone, or almost anything, make some notes for running references later.

Materials

A number of reference books:

Almanacs
Pamphlets
Encyclopedia

West Virginia Trees
Wild Flowers
(A good one is the 4-H project on West Virginia wild flowers)

Pencils, paper or note pads.

Investigation

Pupils make a list of questions to find answers for. The questions can be about anything of interest they see on a short field trip. Locate the information in a reference book, and write the answers to all the questions. Make a Class Bulletin with the stories you have written. You may want to make some illustrations for your stories. Make a list of all the reference books you used and give the page number where you found your information in each book.

Extension

The use of reference books; to answer scientific questions, to learn what plants grow in which type of soil.

Soil conservation.

Geology and Astrology.

References

Modern English in Action, p. 104, Christ (Author), Heath (Publisher)

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row

The Roberts English Series, p. 163, Paul Roberts, Harcourt, Brace and World

Evaluation and Addendum

Pupils organize an informal group for special work. Have them develop pertinent questions on topics to find answers for in reference books. Involve students in oral questions and discussions. See if there is any volunteer to use reference materials for specific answers. Have volunteers look up references and write their findings in their findings in their own words.

Camp

It is assumed that the classroom teacher has made use of the pre-camp outline in such a way that camp classes in the subject area aren't necessary and laboratory work may be done with a minimum of review.

Purposes

1. To give the child an opportunity to exercise his knowledge of identification measures in the plant world.

2. Acquaint the child with several keys in different forms to broaden his knowledge in their methods of identification.

3. Increase students knowledge and appreciation of the out-of-doors, as well as promote community living.

Projects

1. Conduct an exploratory hike to stimulate students to use their senses in finding out what is around them. Specimens may be gathered for collection projects for camp groups or for microscopic study.

2. Use of simple keys will be employed to render first hand experience in applying previous class study. A. All day hike.

3. May visit fire tower and have forester talk about his work.

4. Study parts of a flower and comparison of parts in different varieties.

5. Study what trees and flowers grow in relation to amount of sun and light available, succession, etc.

6. Conduct classes on proper way to plant trees. Allow students to practice by planting trees or flowers.

7. Begin individual or paired plot studies in a chosen area.

8. Use state plant laws in order to become aware of them.

9. Make simple foliage impressions or smoke prints.

10. Finding a food chain of an animal as selected by students. What does it eat? What eats it?

11. Study plant communities - What plants will be found in the community? What animals may be here?

12. Invasion - find a field or area where succession may be observed.

13. Fill out work sheets available for Nature Trails.

Post Camp

Purposes

1. To give sufficient follow up study so that the students enthusiasm will not dwindle.
2. To draw together all student learning and show the correlations.

Activities

1. Do a plant environment chart or bulletin board showing factors found in the plants environment.
2. Make charts showing parts of a plants, uses, or any area covered by class and camp.
3. Do a survey of death in the woods and fields around home. What are the uses of this death matter? What types of dead matter were found?
4. Do a study of unusual plants eaten in the lands of the world.
5. Study a plant (chosen by student) and its uses. There are over four thousand uses for trees. Some plants may be: Bamboo used for rope, sails, cables, and rigging for Chinese junks, roofs, water pipes, bridges, ladders, nails, fishing rods, and soles for shoes and many more; Rice is used for fuel, for making gas, food for cattle, bonnets for ladies, as well as food for humans. The list can go on and on.
6. Discuss how living things alter their environment.

Pre-Camp

Techniques used by Scientist to Study Plants

Purposes:

A. To acquaint the child with several methods used to identify common plants.

B. To prepare the child for field study, in such a way that he will be capable of following a simple key in plant identification.

To name plants involves knowing the parts of the plant so we can understand descriptions written in key books.

Concept

Plants may be identifyed by the petiole or leaf arrangement.

Procedure

Become familiar with the following words.

1. Simple
2. Compound
3. Palmately
4. Pinnately
5. Petiole
6. Leaflet
7. Alternate
8. Opposite
9. Whorl

Identify types of leaves from pictures, group as many ways as possible.

Material

1. Chalk and board.
2. Large pictures of leaf arrangements.
3. Permission to leave school room.

Investigation

Find as many different kinds of leaves as possible around the school grounds for identifying back in class.

Outcome

1. Simple leaves are ones not divided into separate parts (Example: dogwood, maple, sassafras, sycamore, tulip, magnolia, cucumber tree, gum,

persimmon, holly, elms, bass wood, hackberry, poplars aspen, birch, willow, cherry, beeck, chestnut, oak, alder, chinkapin.)

2. Compound leaves have blades that are divided into two or more parts.
    - A. When all the leaflets are joined at the same point resembling a hand with fingers it is said to be palmate. (Example: Buckeye)
    - B. A pinnate leaf is one having a stalk with leaflets arranged one of three ways:
        1. Alternate means to take turns, these are arranged in turn along the sides of the stem (Example: willow, some dogwood).
        2. Opposite means directly across from, these meet at the same point on the stem (Example: ash, box-elder, walnut, butter nut, hickory, locust).
        3. Whorled are grouped into a circle (Example: Buckeye).

Pre Camp

Purposes

1. To become aware of the fact that all living things may be grouped according to characteristics.

2. To become familiar with the basic groups in the plant world.

3. To be able to see the relation and progression between the groups.

Concept

All living things are grouped into two main divisions; plant and animal; these are further divided until the plants and animals are very similiar.

Procedure

1. Become familiar with the following words.

    A. Characteristics
    B. Plant Systematics
    C. Taxonomy
    D. Nomenclature
    E. Kingdom
    F. Species
    G. Thallophytes
    H. Bryophytes
    I. Pteridophytis
    J. Spirmatophytis
    K. Chlorphyll
    L. Algae
    M. Fungi
    N. Protozoans
    O. Poriferans
    P. Coelenterates
    Q. Platyhelminths
    R. Nemathelminths
    S. Annelid
    T. Echinoderms
    U. Mollusks
    V. Anthropods
    W. Chordates

2. Examine a plant cell under the microscope and identify the parts.

3. Examine examples from the 4 major plant groups, compare likeness and progression.

4. Take a common plant through the classification system.

5. Examine animal cells under a microscope and identify the parts.

6. Compare the animal cell with the plant cell. What are the likenesses and differences?

7. Take an animal through the classification system.

8. Find pictures representing animals from the 10 animal phyla. Discuss how they are alike and different.

9. Obtain as many skeletons as possible from vertebrates and invertebrates. Compare the skeletons.

Materials

1. Encyclopedias and Dictionaries
2. Algae
3. Fungi
4. Moss
5. Ferns
6. Flowers
7. Pictures of animals
8. Skeletons
9. Animal Tissue
10. Night crawlers (alive or dead)

Investigation

1. What are the divisions in the system of classification?

2. Why is classification necessary?

3. What are the characteristics for each of the four groups of plants?

4. Grow yeast in order to learn about their activities.

5. Grow a mold garden in order to see the parts, colors, and beauty of molds.

6. What are the major characteristics of the b major phyla of animals.

7. Care for animal projects at school. Examples are fish, frogs, salamanders, snakes, rabbits, hampsters, etc.

8. Dissect a night crawler and identify its internal organs.

9. Become familiar with prefixes that describe an animal or plant.

Outcome

1. All living things are grouped into two main divisions called kingdoms, plant and animal. .

2. The kingdoms are subdivided into phyla, class, order, family, genus, and species.

3. A species is a closely related group of plants or animals.

4. Latin and Greek are used for classification for 4 reasons: (1) So there will be no duplication. (2) Scientific name describes plant or animal. (3) Shows relationships. (4) Latin and Greek are considered universal languages.

5. Plants are the only living things that can make their own food. To make their own food, plants must contain chlorophyll.

6. Thallphytes are very simple plants, with no roots, stems and leaves.

7. Thallphytes contain algae and fungi. Algae have chlorophyll and make their own food, they usually grow in water and are colored; Fungi do not have chlorophyll, they get their food from living or dead matter, they may be colorless or have many colors.

8. Bryophytis have simple leaves, but no true roots or stems, though they do have rootlike and stemlike parts. They contain chlorophyll and are green in color.

9. Pteridophytis have true roots, stems and leaves but no flowers, fruits or seeds. They contain chlorophyll and make their own food.

10. Spermayophytis include all plants that produce seeds. These grow in soil and fresh water.

11. Spermatophytis are divided into angiosperms and gymnosperms..

12. Gymnosperms also called conifers, they have unprotected seeds. Conifer leaves are in the form of needles or flat scales. The trunk of the conifer does not divide, they contain a sticky substance called resin. Conifer wood is soft.

13. Angiosperms are seedplants, producing flowers that form fruits with seeds inside them. Angiosperms have broad, flat leaves, which they lose each year, they are called deciduous plants. The trunk may be divided into two and the branches begin low on the trunk.

14. Angiosperms are divided into monocots and dicots. Monocots produce seeds that have just one seed leaf, dicots have two seed leaves.

15. Protozoans are tiny one-celled animals. Each cell is an independent animal. Common examples are the ameba, paramecium, and euglena.

16. Poriferans are the simplest of the many celled animals. The body is a hollow tube with many pores or openings in it. Sponges belong to this group.

17. Coelenterates are also made of two layers of cells, with tentacles surrounding their mouths. Circulation and digestion take place in their hollow bodies. There is an oppening at one end of the body only. Jellyfish, hydra, coral and sea anemone are examples.

18. Platyhelminths are flattened, ribbon like worms, with bodies that are smooth and have no rings or body divisions. The digestive tube has an opening at one end only. They have very simple digestive and nervous systems. Many of these are parasites. Tapeworm, planaria, and fluke belong to this phylum.

19. Nemathelminths are round worms which have no segments. At times the bodies may be threadlike. They have a definite digestive tube running the length of the body and an opening at each end. Many of these worms are parasites. Examples are hookworm, pinworm and trichinella.

20. The annelids are worms with round bodies that are divided into segments. Earthworms, sandworms, and leeches are in this phylum.

21. Echinoderms are animals with spines on their bodies. They have a hard shell-like kind of skeleton which is on the outside of their body. The parts of their body usually radiate out regularly from the center. The starfish, sea urchin, sand dollar and sea cucumber are in this phylum.

22. Mollusks have soft, fleshy bodies with no segments. Most of these animals have hard shells of lime protesting them. The clam, oyster, scallop, snail, octopus and squid belong here.

23. Anthropods have skeletons on the outside of their bodies. Their bodies are segmented and have definite body regions. Their legs and all other body parts that are attached to the body are joined and can bend. All the parts of their bodies are paired, and are arranged on either side of the body, in such a way that one side of the body is a mirror image of the other. Lobster, crayfish, crab, spider, tick, centipede, millipede and insects are in this phylum.

24. The chordates have a central nerve cord. Most chordates have a backbone and are thus called vertebrates. Their skeletons are on the inside of their body. Each has 2 pair of limbs attached to the body. The 5 big classes of chordates are fish, amphibians, reptiles, birds and mammals.

A. Fish are cold blooded animals, having bony skeletons and a body covered with scales. They breathe by gills, and have an air bladder to help them rise and sink in water.

B. Amphibians are also cold blooded. When they are young they live under water and breathe by gills. They later change and develop lungs for breathing. They are smooth skinned with no scales. Examples are frogs, toads, and salamanders.

C. Another cold blooded animal is the reptile. They breathe by lungs and usually have a rough, scaly skin. Examples include snakes, lizards, alligators and turtles.

D. Birds are warm blooded animals, and breathe by lungs. Their front limbs are called wings, and they are covered with feathers. Their legs are scaly. The skeleton is light, hollow, and streamlined for flying.

E. Mammals are also warm blooded animals that breathe by lungs. They usually give birth to live young and feed their young on milk. All mammals have hair on their bodies though it may be only a few bristles. All mammals have seven neck bones, but these vary in size.

Camp

Purposes

1. To compare plants to see likenesses and differences in characteristics.

2. To study as many examples as possible for the four divisions of the plant kingdom.

3. To identify animals and their phyla that are found around camp.

4. To compare likenesses and differences of animals seen.

Activities

1. Study pond water to see how many kinds of algae may be found.

2. Study pond water to see how many kinds of protozoa may be found.

3. Find as many varieties of fungi as possible.

4. Find as many examples as you can of the four major plant divisions.

5. Examine a conifer and a deciduous tree. Make a list of their similarities and differences.

6. Examine a monocot seed and a dicot seed.

7. Take a sample plot and identify the plants in your plot.

8. Collect one celled animals from the pond and stream. What is the most common one celled animal found? Observe the form and parts of each protozoan, also feeding habits.

9. During the different seasons watch for protective coloring of insects and other animals.

10. Look for animal homes and identify the animal that lives here.

11. Conclude through observance if the type of plants found in an area affect the animal life found.

12.. Watch for migratory habits of birds.

Post Camp

Purpose

1. To correlate learning activities.

Activities

1. Comprise a chart showing the four major plant groups, their characteristics and examples of each.

2. Report on useful plants to man or industry.

3. Make plant prints or spatter prints of type of leaves.

4. Make a chart showing helpful and harmful insects.

5. Collect - kill - and mount insects.

6. Collect and mount moths and butterflies.

7. Collect caterpillars, chrysalides and cocoons.

8. Collect and mount spiders.

9. Collect and identify bird nests.

10. Make chart of helpful and poisonous snakes.

11. Make a terrarium.

12. Make individual balanced acquariums.

13. Grow and observe habits of earth worms.

14. Care for an ant collection.

Objectives (Outdoor Education in General)

1. To provide first hand observation of things of interest that help students understand, interpret, and assimilate ideas concerning materials they are studying in the classroom.

2. To cultivate in the children powers of accurate observation and to build up within them understanding of forces in their environment.

3. To provide opportunities to make learning more interesting and meaningful.

4. To motivate students to further academic pursuits in their basic studies.

5. To develop in the students an understanding, respect, and appreciation for the natural environment.

6. To provide the student with a variety of learning resources to help him understand and interpret his observations.

7. To build an educational program in which there are opportunities to investigate, inquire, explore, and discover new facts.

8. To provide a change of pace activities that will provide for better mental health, provide for an anxiety relief, while involving more effective learning conditions.

9. To strive to give the students the freedom they need for effective learning.

10. To provide the practice necessary for the development of satisfactory human relationship skills.

Science

1. To emphasize to the students how much we depend on the earth's storehouse for our everyday existance.

2. To show that mans way of life makes marked changes in his enviroment.

3. To gather and arrange materials pertaining to subject matter chosen by and for the students.

4. To do activities that are based on manipulatory and sensory experiences that will be an important success experience for the student.

5. To provide learning experiences with the minimum of supervision.

6. To discover the many factors which influence plant and animal life.

7. To conduct scientific research in areas of interest to the student.

8. To provide for the students an opportunity to have real experience in using methods of the scientists.

9. To help the students to come to understand the nature of science.

Letters represent - Volume
Numbers represent - Pages

World Book Encyclopedia

WHAT DO YOU KNOW ABOUT PLANTS?

1. What plant ranks among the largest and oldest living things on earth? S-244
2. According to legend what did a small blue flower say to Adam and Eve as they were leaving the garden of Eden? F-351
3. What tree has no branches? T-337
4. What kind of plant can produce over 16 million like itself in 24 hours? B-17
5. What plant product did South American Indians use for making "waterproof shoes"? R-460
6. What tree was said to bring death to birds that perched in it or flew over it? U-168
7. What plant gets its name from its use by superstitious people? W-309
8. What is another name the Australians have for the eucalyptus tree? A-891
9. According to superstition, what plant shrieks when it is pulled out of the soil? M-103
10. What important family of the plant kingdom includes 2,000 species of trees, shrubs, and herbs? R-459
11. What plant, which grows entirely underground can be found by trained dogs or pigs? T-381

TRUE OR FALSE

1. The flower called "Mignonette" gets its name from a French word which means "Little Stinkweed". (T) (F) M-449
2. Air plants are parasites? (T) (F) A-184
3. Trees such as pine, elm, oak, bear flowers? (T) (F) T-337
4. Daffodil bulbs should be planted in autumn. (T) (F) D-3
5. A pomato is a cross between a tomato and a potato? (T) (F) B-590
6. The word "dandelion" comes from French words meaning "lions tooth". (T) (F) D-25

7. Orange trees do not resist cold as well as lemon trees do? (T) (F) O-615

8. A Baobab is a type of tulip? (T) (F) T-347

9. The Indian Pipe Plant is red, like the burning tobacco of a glowing pipe? (T) (F) I-141

WHAT DO YOU KNOW ABOUT ANIMALS?

True or False

1. Small dogs can usually hear better than large dogs. (T) (F) D-219
2. Most female goats do not have beards. (T) (F) G-226
3. The male ostrich roars like a lion. (T) (F) O-660
4. You can carry an African Eland in a matchbox in your pocket. (T) (F) E-112
5. The mole cricket, like other crickets, can play a tune with its wings. (T) (F) M-518
6. A mouse has as many neck bones as a giraffe. (T) (F) G-179

Underline the correct answer

1. A (horse) (parrot) (cat) was once made a consul by a roman emperor. C-55
2. A goebuck is (a large duck) (a large clam) (a small insect) (a small turkey). G-232
3. The Lhasa apso is (a breed of dog) (an Asiatic duck) (a type of dromedary) (a dolphin). D-218

Fill in the blanks

1. What fish has body colors that change to match the ocean bottom?________ A-464
2. What bird can kill or cripple a man?________ A-445
3. For a camel race, would you choose a one-lumped or a two-lumped camel?_______ C-64
4. What insect has no need for food, and is often born without a mouth or stomach?__________ M-257
5. What bird can fly as fast as 180 mph?_________ B-271

6. What beetle is 4" long and 8" wide?__________B-171

7. What animal grows a web between his toes in winter time so he can walk over snow?________R-473

8. What kind of bear doesn't hibernate in winter?___________B-140

9. What animal that is not a worm can continue to live after it has broken into two equal parts?___________G-208

10. Legend says the black spot on the side of_________is a thumbprint left by Saint Peter when he removed a coin from this fish's mouth. J-111

WHAT DO YOU KNOW?

1. What ancient Greek scientist boasted that he could move the earth if he had a place on which to stand? A-565

2. What science deals with the study of fossils? P-85

3. Who has been called the founder of modern experimental science? G-10

4. What are the six simple machines? M-10

5. How many kinds of minerals have scientists collected? M-481

6. What book is considered to be one of the greatest single contributions in the history of science? N-307

7. What is the smallest amount of time? M-584

8. What is the science of separating metals from their ores and preparing them for use? M-350b

9. What four sciences do oceanographers use? O-498h

10. What element is used as a standard to give atomic weights to all the other elements? C-167

11. Why is the sky blue? S-410

12. What metallic element is sometimes called "quicksilver"? M-338

13. How is the flame test used in identifying chemical elements? F-199

14. How does atmospheric pressure affect the boiling point of liquids? B-348

15. What is one of the toughest, strongest, and most elastic substances in existance? N-471

WHAT DO YOU KNOW?

1. How does the Surinam toad raise its young? S-808

2. Upon what basic process does all life in the world depend? B-416

3. How does a porcupine protect itself? Does it shoot out its quills? P-606

4. If it were possible for a man to stand on the sun, how much would he weigh there? S-782

5. What is a "Resurrection plant"? R-245

6. What is a "Loadstone"? How did it get its name? L-361

7. Why is a fish more likely to be frightened by a footstep on the bank of a stream than of human voices? F-146

8. Where is the deepest place in the oceans of the world? O-491

9. Approximately how many working days are lost each winter in the U. S. because of colds? D-183

10. What is the largest living bird? O-660

11. What is the tallest animal? G-1[illegible]9

12. What was one of the first forms of consentrated foods? P-207

13. What is the name for the period in the year when day and night are of equal length all over the world? E-268

14. How old is a camel before its fullgrown? C-66

15. Are mushrooms nourishing? M-783

16. What is the average life span of the Hippotamus? H-228

17. What is the largest member of the Deer family? M-654

18. Where does the moon get its light? M-650

19. What is mans most valuable sea food? 0-681

20. Opium is made from what plant? 0-611

21. What part of the earths surface is covered by water? 0-490

22. How much honey does a worker bee collect in its entire lifetime? B-155

23. What is the most distinctive physical feature of a human being? F-3

24. What does the oak tree symbolize? 0-474

25. How did the muskrat get its name? M-806

ACTIVITIES THROUGH THE YEAR

January

1. Find the reasons for the seasons using a globe, card table, and table lamp without a shade. Let the lamp represent the sun, with chalk mark the spot where you live. Spin the globe slowly to make day and night in your part of the world.

2. Grow an indoor garden-empty milk cartons make excellent planters.

3. Snow sculpture is a good outdoor activity.

4. Study leaf scars during the winter when they are best seen. Most leaf scars seem to have funny "faces".

5. Find out what birds eat during the winter and help them find food by building bird feeders.

February

1. Make a model planetarium with clay, tennis ball sun, marbles, ball bearings and string. Place on flat cardboard that has been covered with clay.

2. Take a look at the stars during this month. Many constellations do not look the same as they do on a printed page.

March

1. Do experiments on air. Using a yard stick, string and two paper bags make a scale, adjust it until it balances. With a lamp heat the air in one bag. What happens ? Using a paper spiral snake, a thimble and needle test for convection currents.

2. Using paper, string, and sticks make kites for outside play.

3. Make a wind indicator with a wooden stand, a light weight wood arrow, a drill and a nail.

4. Make a rain guage using a "round" quart milk bottle and a funnel. The

wide end of the funnel and the vase of the bottle should be the same diameter. Mark inches off on the side of the bottle with paint.

April

1. Check the time between lightning and thunder during a storm by using a watch with a second hand. Note the number of seconds between the lightning and the thunder. How far away was the flash? (Remember sound travels 1100 fps or approximately 1 mile in 5 seconds.)

2. Construct a barometer with a rubber band, a balloon, a thin can, some glue, a straw and a paper has been marked as a guage.

3. Study 4 different types of soil for texture and structure.

4. Learn about root structure by growing lawn grass. Cut away soil as you would a piece of cake as grass grows.

5. This is the time to plan a garden and spade and rake garden plots.

May

1. Make a homemade helicopter by using a spool and several inches of string wound around a spool, 2 small nails across from each other on the spool and a cardboard propeller (6" long) place a pencil snugly in an empty spool. Now place spool containing thread and propeller on inserted pencil. Pull string quickly.

2. Learn to recognize poison ivy, poison sumac and stinging nettle.

3. Watch for returning migrating birds. Watch for birds nests and eggs.

June

1. Begin an indoor or outdoor Natural Science Museum from your collected materials, a minature zoo will also be fun.

2. Collect ants and watch their activities.

3. Watch for and learn to identify some of the common butterflies.

4. How easy is it to find a 4-leaf clover in a field of clover?

July

1. Learn to take good photographs. You may even begin developing your own pictures.

2. Take a hike to identify wild flowers in bloom.

August

1. Take a hike with paper coloring matter to capture summer scenes.

2. Try your hand at building a temporary or permanent grill.

September

1. Try your hand at canning fruits and vegetables from your garden.

2. Find out what fall flowers are found around your area.

3. Look for types of fruits and seeds.

October

1. Make corn cob and acorn dolls.

2. Make leaf and seed prints using finger paints.

3. Obtain information on boomerangs an make your own.

4. Watch bird migration-do they follow a definite route?

5. Collect and identify types of leaves.

November

1. Make your own acquarium.

2. Try your hand at soap sculpture.

3. Plant bulbs for next year.

4. Practice outdoor cooking safety.

December

1. Make your own pop bottle orchestra using various sized pop bottles and water.

2. Make a reed pipe using soda straws mashed on one end and cut off to different lengths. Place straws evenly apart on tape.

3. Try your hand at a snow igloo.

What Do You Know?

1. What is "basal Metabolism"? M-340
2. What is the cause of "fainting"? F-6
3. In "sunstroke" how high may a person's body temperature go? F-88
4. What is the difference between a "simple" and a "compound" fracture? F-391
5. Are "freckles" hereditary? F-421
6. Is the "funny bone" a bone? F-485
7. What mosquito carries malaria? M-689
8. What are some main causes of blindness? B-320
9. What is considered normal blood pressure for all adults? B-328
10. How long does it take a broken bone to heal? B-368
11. Is "epilepsy" a communicable disease? E-264
12. When is the appearance of excellent muscular development sometimes an indication of a disease? M-774
13. When is ether dangerous to use as an anesthetic? E-291
14. Is "leprosy" usually "fatal"? L-179
15. Why is a person unable to taste a piece of dry sugar or salt until a little of it has dissolved? T-40
16. Why are tears necessary to the eye to prevent blindness? T-60
17. What is the most common disease of mankind? T-70
18. When is "pneumonia" most often fatal? P-525
19. What flower is used in the treatment of heart disease? F-381
20. What is the importance of water to the health of our bodies? N-467
21. In treating frostbite, should the affected area be rubbed with snow? F-469
22. Is an area of skin more or less susceptible to cold once it has been frostbitten? F-469
23. What is meant by 20/20 vision? E-358

24. In what part of the body is the feeling of pressure (touch) most highly developed? Where is it the poorest? T-269

25. What are some common optical illusions? O-613

26. Is memory a power carried on by a special part of the brain? M-319

27. Do women have more "intuition" than men? I-279

28. What kind of imagination makes a person daydream? I-67

29. When may a normal person experience "hallucinations"? H-26

30. What are some of the main causes of headaches? H-122

31. When does a person learn best and most quickly? I-248

32. Scientists have found that everyone dreams how many times in a night? D-276

33. What contagious disease occurs most frequently in the U.S.? D-185

34. Can noise actually harm the ear? E-5

35. Since no antidote is known for the poison of the "death cup" mushroom, what is the only hope for anyone who has eaten it? M-783

36. Why do wrinkles appear in the faces of older persons? H-122

37. What is the weight of an average mans heart? H-136

38. Is the bone injured when a sprain occurs? S-630

39. What is the most important of all citrus fruits? O-615

40. What causes the bluish tinge in a "blue baby"? H-138

PRE CAMP

Purposes

1. To show through activities some of the factors in the plants environment that affect it.

2. To instruct the child in such a way that "cause and effect". practices can carried out in camp groups.

Concept

Communities of living things are based upon the chemical and physical relationships of an environment.

Procedures

1. Study different types of soil so as to recognize differences.
2. Arrange plants according to growth and altitude.
3. Do experiments with plants on amount and kind of light needed.
4. Experiment with plants and temperature.
5. Find out how much air and air pressure plants need.

Materials

1. Each experiment will need different equipment.

Investigation

1. How do soils differ in color, texture and weight, which holds more moisture, which is most acidic, how much dead matter is in soil? (Experiment)
2. What plants grow under water and how far down?
3. Do the different types of plants need the same amount of light?
4. Test plants to see if temperature affects them.
5. What affect does the air about us have on plants?
6. What plants grow on or near the "tree line"?
7. What steps are involved in plant succession?

Outcome

1. Plants utilize mineral compounds from the soil as needed.

2. Some plants need an alkaline soil, others an acid soil.

3. Sandy soil holds little water while clay soil holds much water.

4. Soil may be rich in humus which is decaying matter, this contains bacteria, mold, young insects and other animals.

5. Humus soil is loose and the top layers hold water a long time.

6. Grassland soil is usually rich in humus, it also holds water well.

7. The amount of water that a plant draws is affected by the amount of rainfall, when the rain falls, and the kind of soil that receives and retains the rain.

8. In the sandy southeastern evergreen forest many pines are grown due to the sandy soil. The evergreen has narrow leaves that reduce water loss.

9. Further inland in the eastern hardwood forest we find broad-leaved trees. The rainfall here averages 40-50 inches a year and the soil is richer.

10. West of this forest were the once tall grass prairies. Today it is rich agricultural land. The rainfall is 30-40" although most of this occurs in spring and is followed by summer drought.

11. The plains are west of this prairie. Here grasses are short and are adapted to a rainfall of 20-30". The short grass is suitable for cattle areas.

12. In the Rocky Mountains, forests appear again because of the increased rainfall in the higher altitudes. Trees go up to a timber line, where rocky soil, high winds and extreme cold prevent growth.

13. Westward from the Rocky Mountains to the edge of the coastal ranges is an area with less than 10" of rain a year.

14. Along the costal regions rain may equal 80" a year. Many of our largest trees are found in this area. Much of the moisture comes in the wind from the

ocean. These costal regions are the cause for the dry land to their east.

15. A few kinds of green plants are fitted for living ½ mile (some books say 600 ft.) down in the sea; that is as far as light reaches. Most grow in upper 50 to 60 ft.

16. Some smaller plants can grow 3 miles above sea level, through the "tree line", where trees stop growing on a mountainside is always lower down.

17. Light is essential as a source of energy to all green plants in food-making.

18. There are plants that live in complete absence of light, but they depend indirectly on light.

19. Deep valleys, floors of a forest, or the north side of a hill are places to find plants with low light requirements. Open fields, southern slopes and other exposed places will have plants needing full sunlight.

20. Different kinds of plants have different "time clocks". Their seeds germinate, grow and produce flowers at different times.

21. A light sensitive pigment, found in all plants, called phytochrome has been shown to cause reactions in plant growth.

22. Some kinds of plants need alternate seasons of warmth and cold in order to form flowers and seeds.

23. Many plants, such as the seeds of some oaks, will not germinate unless they have been frozen. Plants like these cannot survive in climates that are warm the year around.

24. The air about us is about 20% oxygen. Except for certain bacteria, all living things must have free oxygen in order to live.

25. The depth to which life can penetrate the soil is partially dependant upon oxygen.

26. Air pressure also has a direct influence on living things. Storms

may destroy plants.

27. Air currents and wind have a great effect on plant life. Winds greatly increase the rate of evaporation of water.

28. Plant succession is the movement of gradual changes in the composition of a community toward a climax, until we recognize it as a different type of community.

29. A field succession will be shown as field → annual weeds → perennials shrubs → pioneer trees → climax.

30. Succession comes about due to:

1. Wind storms
2. Fire
3. Biotic factors
4. Floods
5. Climatic changes
6. Man

31. When environments change three things may occur:

1. Adapt
2. Migrate
3. Die

32. The longer a community lives the more complex it is.

33. Primary succession begins with an area exposed for the first time or on an area where no vegetation has grown before.

34. Primary succession involves:

1. Bare rock
2. Lichens (speed-up weathering)
3. Mosses (build up soil)
4. Ferns
5. Shrubs
6. Pioneer trees (must have exposure to light)
7. Climax trees and plants

35. Forest climax stages are:

1. Beech - Maple
2. Oak - Hickory
3. Boreal Forest
4. Maple - Basswood
5. Beech - Maple - Hemlock
6. Oak - Chestnut

36. Secondary succession occurs on an area cleared or otherwise modified man or where effects of previous vegetation remains.

Camp

Purposes

1. To bring the child out-of-doors to see natural plant adaptations to environment.

2. To conduct "cause and effect" trips to various territories to determine

   A. Physical factors distinguished from biotic factors.
   B. Environmental conditions control distribution of life.
   C. Environmental factors responsible for plant formations.
   D. Areas of plant succession.

Activities

1. Study a north facing and a south facing slope. For each slope note the following:

   A.. Light conditions
   B. Amount of slope
   C. Temperature of air and soil
   D. Relative humidity
   E. Estimate moisture conditions, such as, amount of run-off and amount of evaporation.
   F. Test soil conditions for - temperature, pH, amount of humus, origin of soil, composition.
   G. Why are the two communities different?
   H. How has environmental factors influenced the type of communities observed.

2. Study a pond habitat and its stages of development. Determine the following:

   A. Size, shape and origin of pond
   B. Depth of pond
   C. Environmental factors
      a. Temperature of air, water, soil at edge.
      b. Relative humidity
      c. pH
   D. What plants are found at the margin
   E. Group plants according to:
      a. Floating
      b. Submerged
      c. Emergent

3. Study a field that is no longer being cultivated. Determine the following:

- A. Origin and history of the field
- B. Determine the physical factors
  - a. Time
  - b. Temperature of soil and air
  - c. Elevation
  - d. Soil pH
  - e. Humidity
  - f. Topography
- C. List plants typical to the area.
- D. What animals are common to the field? Is there any relation between types of plants and animals found together?

Concept

Bark maybe used in the winter to identify trees.

Procedure

1. Observe bark of several trees.

2. How may bark of trees differ?

3. Become familiar with:

   A. Bark
   B. Texture
   C. Cambium
   D. Lenticels
   E. Vertical
   F. Horizontal

Materials

Bark obtained from mill, trees around school yard, pictures of bark.

Investigation

1. How many ways may bark differ.

2. Sort bark into groups according to color, thickness, texture, etc.

Outcome

1. Bark may be used to identify trees by color, texture, and growth pattern.

2. The color of bark may range from whitish gray to almost black.

3. In young trees the outer bark is very thin, as the tree grows an inner cambium layer is formed.

4. One feature of bark is its young stages is the presence of lenticels, small dots that are really openings in which gasses interchange within.

5. Young trees show lenticels as small white or gray dots, as the tree grows these dots become lengthened until they are lines in the bark.

6. These lenticels form the rough to smooth surface quality of a tree.

7. Some lines may be vertical while others are horizontal.

8. The function of the bark is to protect the interior parts from rapid temperature changes.

Concept

The numbers of petals found on a flower, color, flower parts and flower shapes are used to identify flowers.

Procedure

1. Ask if all flowers are alike.
2. List ways in which flowers may differ.
3. List parts of flowers and function.
4. Words to become familiar with:
   - A. Calyx
   - B. Sepal
   - C. Corolla
   - D. Petals
   - E. Stamen
   - F. Anther
   - G. Filament
   - H. Pollen
   - I. Pistil
   - J. Stigma
   - K. Style
   - L. Ovary
   - M. Ova

Material

1. Flowers from home or florist.
2. Large picture showing parts of flower.
3. Microscope.

Investigation

1. List ways in which flowers are different.
2. Check several varities of flowers to count petals.
3. Identify parts of flower.
4. Sort flowers according to shape.
5. Relate prefixes sym and poly to flowers.
6. Take a flower apart and make charts to show parts.

Outcome

1. Dicots have flower parts in fours or fives or multiples of 4 or 5.
2. Monocots have flowers in threes or multiples of 3.

3. Flowers may be grouped according to color as: green, white, pink, wine, red, yellow, blue, or purple.

4. The two main parts of the flower are the calyx and the corolla.

5. The clayx contains sepals which protect the flower in the out stage.

6. The corolla contains the petals.

7. The male part of the plant is the stamen; this has an anther on a stalk called a filament.

8. The anther produces the pollon.

9. The female parts are called the pistil.

10. The pistil consists of a sticky top called a stigma; a tube connecting the stigma and ovary called a style; and an ovary containing eggs or ova.

11. Flowers are of many shapes, these are usually grouped as regular and irregular.

12. Regular flowers have all petals the same size and shape.

13. Irregular flowers petals are not the same size and shape (Example: violets and sweet peas).

Concept

Monocots are found to have leaves with parallel veins while dicots have leaves which are netted.

Procedure

Become familiar with the following words:

1. Parrallel
2. Netted
3. Pinnately
4. Palmately
5. Midrib

Check gathered leaves for veination.

Material

Collected leaves from flowers and trees.

Investigation

Compare veins of collected leaves.

Arrange leaves into many groups showing ways of grouping; as type of leaf veins, trees, etc.

Outcome

1. A vein extends from a midrib and is a continuation of the petiole into the blade of the leaf.

2. Monocots have veins that are parallel (Example: palms, grasses, lillies, lady slipper).

3. When the ends of the monocot leaf are nibbled away the parallel veins enable it to grow out again.

4. Dicots have netted veins which may be grouped into pinnately or palmately.

5. Pinnately veined leaves have veins extending from the midrib in many places.

6. Palmately veined leaves have veins extending from a point at the base of the leaf.

Conifers

Concept

Gymnospersm have naked seeds.

Procedure

1. Become familiar with:

   A. Evergreen
   B. Naked Seed
   C. Perennial

Material

1. Conifer Cones.

2. Clusters of needles.

Investigation

1. Discuss and become familiar with words.

2. Count needles in clusters.

3. Observe likenesses and differences in cones.

Outcome

1. Conifers have uncovered seeds.

2. The leaves are needles or tiny and scale-like.

3. Leaves remain on the plant for 2-3 or more years before dropping off.

4. Because the living tree is never without needles it is called an evergreen.

5. Not all evergreens are gymnosperms.

6. Gymnosperms are perennials that grow as trees or shrubs.

7. Gymnosperms are soft woods.

8. Hemlocks have the shortest (½") needles and darkest green color of all evergreens. Each needle has two white streaks in the center on the underside. The needles are short and blunt and grow singly all along both sides of the branchlet making a flat spray. The branches droop gracefully and the bark is reddish-brown.

9. If the needles are four-sided, short and stiff, form a "bottlewasher" and prick and has cones that hang then its a spruce.

10. Red, Black and White spruce are difficult to tell apart unless seen together. (Red spruce is darker green and usually has more forward pointing needles. Black spruce is lighter, bluish green, White spruce is light yellowish- to bluish green and needles appear farther apart.)

11. The Norway Spruce has needles that appear to grow flatter (less around the stem) than other Spruces. Usually dark green with twigs that tend to be yellowier than the others.

12. The Colorado or Blue Spruce tends to have longer needles than the others, with color from dark green to bluish-green.

13. If the needles are long (2"-10") and the cones hang its a pine. The needles are usually held together by a paperlike sheath in clusters of 2 to 5.

14. Two needle clusters - Jack Pine, and Austrian Pine, Virginia Pine, Scots Pine, Table Mt. Pine, and Red Pine.

15. Short-Leaf Pine has both 2 and 3 needle clusters on the same tree.

16. Three needle clusters Pitch Pine, Loblolly Pine, and Long-Leaf Pine.

17. Five needle pines are the White Pines.

Concept

The twig of a tree is ideal for studying the external structure of a woody plant. In regions where trees shed their leaves during autumn a dormant winter twig may be found.

Procedure

1. Examine twig to find buds, scales, scars, no deslenticels.

2. Become familiar with:

   A. Terminal
   B. Bud Scale
   C. Auxillary Bud
   D. Lateral Bud
   E. Bud-scale Scar
   F. Node
   G. Leaf Scar
   H. Lenticel
   I. Bundle Scars

Material

1. Twigs containing buds.

2. Microscope.

Investigation

1. Examination of twigs for its parts.

2. Define parts or tell function of as they are identified.

Outcome

1. Buds are perhaps the most noticeable structure of a dormant stem; this is the point from which new growth will develop.

2. In cold climates winter buds are protected by overlaping bud scales, these compeltely enclosed growing point and keep it from drying out.

3. The terminal bud is found on the tip and contains the terminal growing point, this may not be found on all twigs.

4. Along the sides may be found lateral buds, from which branches will develop.

5. At intervals along the twig, circular oval or shield shaped leaf scars mark the point of attachment of leaf stalks from previous seasons.

6. Minute dots on the leaf scars called bundle scars show where conducting tissue carried water and dissolved minerals into the leaf. These bundle scars are of a definite number and arrangement, depending on the species.

7. In examining lateral buds they are usually found just above a leaf scar.

8. A node is a point from which leaves or branches are produced from a stem.

9. If winter twig has one leaf scar at each node, the leaves are alternate.

10. If there are two leaf scars the leaves are opposite.

11. If three or more leaf scars are present at each node, the leaves are whorled.

12. On especially young twigs you may see tiny pores called lenticels. These allow air to enter and water to escape from the twig.

13. When terminal buds sweel and drop their scales at the beginning of the growing season, a series of rings encircling the twig maks the place where the bud scales were fastened, these rings are called bud scale scars.

14. By starting at the present terminal bud and counting the sets of bud-scale scars you can find the exact age of a twig.

15. Some twigs bear characteristic thorns that may be used for identification. These thorns may be either short and broad, long and pointed or branching.

Concept

Fruits and seeds are many times used to identify plants.

Procedure

1. What is a fruit?
2. Check bulletin board for fruits.
3. How many kinds of fruits are there?
4. How are seeds scattered?
5. Become familiar with:
    - A. Fruit
    - B. Pome
    - C. Drupe
    - D. Berry
    - E. Achene
    - F. Pod
    - G. Capsule
    - H. Dry
    - I. Fleshy

Materials

1. Large display of types of fruits.
2. Display of as many fruits as possible (have children gather some).

Investigation

1. List or name as many fruits as possible from board.
2. Sort display into types of fruits.

Outcome

1. A fruit is defined as the ripened ovary of a plant containing the seeds.

2. A pome is a fruit with the outer fleshy layer developed from calyx and receptacle; it has lots of flesh and many seeds (Example: apple, pear).

3. A drupe has thin skin, lots of flesh and one single seed called a pit or stone (Example: plum, cherry, peach, olive).

4. A berry has the entire ovary fleshy and often juicy, it is thin skinned and contains many seeds (Example: tomato, grape, gooseberry).

5. A modified berry is like a berry but it has a tough skin (Example: oranges, lemons, cucumber).

6. Other berries are aggregate fruits, accessory fruits and multiple fruits.

7. Dry fruits are classified as dehiscent and indehiscent.

8. A pod is a dehiscent fruit with a thin wall, contains many seeds and the ovary splits along one to two lines when ripe (Example: bean, pea).

9. Capsules also have many seeds by splits open when mature (Example: Irish Poppy).

10. A nut is an indehiscent fruit with a hard ovary wall enclosing a single seed (Example: Acorn, pecan, hickory nut).

11. Grain achene have thin ovary walls fastened firmly to a single seed similar to grain, but with wall separating from seed (Example: corn, wheat, oats, sunflower, dandelion).

12. Winged fruit or samara are similar to achene but with a prominent is wing attached to ovary wall (Example: maple, ash, elm).

13. Seed dispersal is accomplished by wind, water, animals, and the plant itself.

Experimenting with plants and light.

1. Use green coleus or any plant that has been kept in the dark for several days. Cover one leaf with aluminum foil. Place the plant in bright light and give it plenty of water. Leave the plant like this for one class period. During the next class period remove the covered leaf and one leaf which was left uncovered.

Test the two leaves for starch by boiling the leaves in water and then soaking them in hot alcohol until the leaf shows no more green.

Now place the two leaves in an iodine solution. How do you explain what happens?

2. Plant a corn seed in each of 4 test tubes by the following mehtod. Soak a piece of blotter paper in water - after paper is soaked roll it into a roll that will fit into a test tube. On the outside of each roll secure one corn seed.

Place a small amount of water in the bottom of each tube. Now place the blotter paper containing the corn seed in the tube, making sure one end is in the water.

Place two of the test tubes in complete darkness.

Place the other two tubes where they receive daily sunlight. Now observe for the next two weeks.

More water may have to be added.

Experimenting with soil.

Collect 1 quart each of several types of soil. Describe soil according to color, texture, and dry weight.

Using dry soil of equal weight portions test to see which holds the most water.

Using litmus paper now give the wet soil solutions the acidity test.

Soil may also be tested for organic and inorganic mineral matter.

The following test may be used.

Compound	How to Test	Result - if present
Starch	Soften soil - add iodine solution	Blue or bluish-black
Glucose	Add benedicts solution-heat	Greenish or orange
Protein	Add nitric acid, heat, add ammonia	Yellow to orange
Fats	Rub on paper	Translucent spot
Minerals	Burn in flame	Residue - won't burn
Water	Warm - hold cool glass over vessel	Film forms on cool surface

Experimenting with temperature and plants.

Soak 12 bean seeds in water over night in a seed germinator. Next day plant 2 seeds in soil or sand in each of 5 paper cups (place seeds approximately ½" below surface). Place the remaining 2 seeds in an ice cube division of a refrigerator ice tray. Now place 2 cups containing seeds on a window sill and 2 cups containing seeds in the refrigerator. *After 2 days take the 2 cups from the refrigerator and place them on the window sill. Remove the seeds from the ice tray and plant them in a 5th paper cup and place them in a window sill. Now place seeds from heated area on window sill. Keep all soils moist by watering sparingly. Which seeds will grow?

* Place two cups containing seeds in a very warm place (furnace room is good).

Experimenting with Pressure.

Obtain 2 rubber suction cups, press one suction cup hard against a clean blackboard.

Hold the second suction cup against the board without pushing hard. What happens to the 2 cups when the hand is taken away.

Fill a glass with water. Cover the glass with a square of cardboard. Hold the glass over a container. Pressing the fingers of one hand against the cardboard to keep it in place, quickly turn the glass over and remove your hand. What happens?

Put a soda straw through the cap of a bottle of milk. Seal the space between cap and straw with paraffin so that no air can enter the bottle except through the straw. Try to drink the milk through the straw. What happens? Now remove the cap and suck on the straw again. What happens?

Objectives of Outdoor Mathematics Activities

1. Ability to make measurements of accessible and inaccessible distances.

2. Children will demonstrate the ability to convert of one unit of measure to another unit of measure.

3. Children will discover the need of standard units of measurement and demonstrate their use.

4. Children will demonstrate the ability to determine the speed of moving objects.

5. Children will demonstrate the ability to collect and interpret data.

6. Children will recognize geometric shapes in nature.

Concept to be developed

Finding the percent of slope of a hill.

Procedure to follow

Place a carpenters level on a straight board 100 inches long. Rest one end of the side of the hill whose slope is to be found. Raise or lower the other end of the board until the "bubble" in the carpenters level is exactly between the indicator marks. At the end of the board opposite the end resting on the side of the hill, measure in inches, the vertical distance from the bottom edge of the board to a point on the ground directly below the end of the board. The number of inches measured is equal to the percent of slope.

Materials necessary for activity

Carpenters level.

Board 100 inches long or other length as explained in extension.

Yard stick.

Investigation

Use hills of different grade to show how the steeper hills have greater slope.

Extension

A 100 inch board may be too cumbersome to carry. A 50 inch board can very well be used, but the number of inches in the vertical distance must then be doubled to obtain the percent of slope, since only half of the required 100 inches of horizontal distance has been measured.

Slope is defined by the rise (vertical distance) divided by run (horizontal distance). The reason for using the 100 inch board is to get the 100 for the run or the denominator of the fraction. Actually, any reasonable length of board could be used. The ratio of the vertical rise to the horizontal distance could be found, written as a fraction, and this fraction could be expressed in terms of hundredths, either by expanding the fraction or by dividing its numerator by its denominator.

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row, pp. 85, 86 Project 126.

Evaluation and Addendum

Ask questions about definition of slope. Find out if they have a concept that slope is the quotient of rise divided by run.

Ask questions about definition of percent. Find out if the students have the idea that percents is defined as parts of one hundred.

Check slope of different areas.

Concept to be developed

Collecting data and using same data to plot a variable graph.

Procedure to follow

1. Data to be used will be temperatures at the hours of the day from 7:00 A.M. until 10:00 P.M.

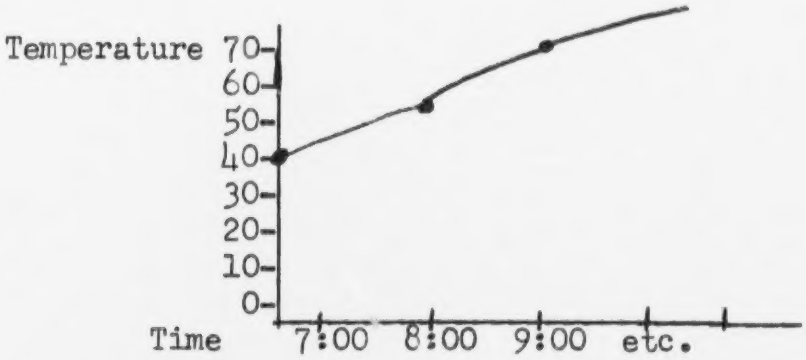
2. Break class into 4-5 small groups. Let them select a leader.

3. Have each group place a thermometer somewhere on the ground. (Not directly in the sun.)

4. Each group should prepare a data sheet.

HOUR	TEMPERATURE
7:00 A.M.	40°
. . .	. . .
. . .	. . .
. . .	. . .

5. After this has been collected each student should prepare a graph from the data sheet.



Materials necessary for activity

4-5 Thermometers one for each group.

Graph paper.

Investigation

Compare graphs and data one from each group. If there is a difference in the data explain that instrument such as a thermometer are not perfect. (Especially inexpensive ones.) What was the temperature at the half-hour. Is this accurate or an estimate.

Extension

Discuss about making different graphs with different data. Such as electricity costs per house.

Reference

Evaluation and Addendum

Lead discussion back in classroom about graphs and see if they can come up with any ideas of things, they might be able to graph. Point out that some of the points between might not have any meaning as does 7:30 does in the graph of hour against temperature.

Concept to be Developed

Determing the speed of water flow.

Procedure to follow

Find the number of seconds a floating object (table tennis ball) takes to travel 10 ft. From the result in the preceding step, determine the number of feet the object travels in one second. (If the object travels the 10 ft. in 4 seconds, then dividing 10 by 4 gives 2 1/2 ft. per second.) Determine the number of seconds in one hour (60 x 60 = 3600). Then multiply this number by the number of feet the object travels in one hour by the number of feet in a mile (5,280) to calculate speed in miles per hour.

Materials Necessary for Activity

Stop watch, table tennis ball, 50 or 100 ft. tape.

Investigation

Check other spots in the stream to see if the speed of the water flow varies. Why does or why doesn't this speed vary?

Extension

A distance of 10 feet may be to short. You may try 50 feet. Develop the concept that distance is equal to rate times the time. Then that rate (this is what you are interested in) is equal to distance divided by time.

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row, P. 84, 85, Project 125.

Evaluation and Addendum

Ask questions about distances, rate, and time and how they are related. Compare rate of flow at this small stream to a large stream. Why does the rate of flow of stream differ from one location to another?

Concept to be Developed

Need of standard units of measure. Discover how to measure the distance between two points without using standard measuring devices, or standard measuring units.

Procedure to follow

Have students select materials such as: rope, stick, etc. and measure with these devices the devices the distance between two points. Students should compare methods and results. Try it again, exchange "measuring devices" and compare their results. Discuss the differences in results with different "Measuring devices," and lead up to the point. Why we needed some standard device and unit? Now hand out some tape measures and let them discover that their measurements are close in agreement. Why are these measurements only approximately equal?

Materials Necessary for Activity

Different length of rope, different lenghs of sticks, a person's foot, body length and length of pace, tape measure.

Investigation

Discuss why necessity brought about the use of standard lengths and other measures.

Extension

Did anyone need to fractional parts of a unit when using "Ropes" "Sticks" and other non-standardized devices? What did the fraction really mean? How accurate were they?

Evaluation

Ask question dealing with "Non-standardized" units and stanardized units and discuss the necessity of having our different units. Compare metric and English systems and discuss the possibility of all nations having the same units of measure.

Concept to be Developed

Estimating heights by the "Shadow Method."

Procedure to follow

Choose a child whose height is known (or measure his height to the nearest inch) Measure the length of the child's shadow with a tape measure in inches. (Conversion may be necessary). In the same manner measure the length of the shadow of the tree. Divide the length of the shadow of the tree. Multiply this quotient by the height of the child to calculate the height of the tree. Why?

Conditions and Materials Necessary for this Activity

Sunny Day, tape measure

Investigation

Discuss weather the shadow of the tree or child respectively will be the same length all day. Show how this changes the shape of the similar triangles.

Extension

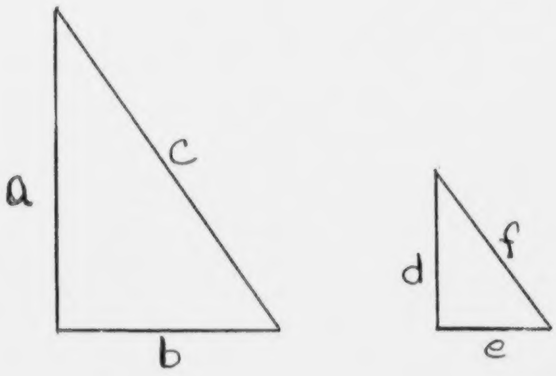
Similar triangles and ratios of corresponding sides should be discussed before and after this exercise. The changing of feet to inches and inches to feet is necessary for this project.

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row, P. 80 Project 117

Evaluation

Discuss the idea of corresponding sides of similar triangles with reference to respective ratios. ($\frac{a}{d} = \frac{b}{e} = \frac{c}{f}$)



Concept to be Developed

To discover pi as a ratio of circumference to diameter of circular shaped objects such as trees.

Procedure to follow

Break up in small groups of 3 or 4 children and select trees for each group to measure the circumference and diameter. Using twine measure the circumference and the diameter of the tree. Measure the twine with a yard stick and record. (Round off measurements to nearest inch). Now have each group fill in the following chart.

C	D	C + D	C - D	C x D	C ÷ D

Each group should measure about six trees.

Which column(s) approximates a constant.

Materials to be used

Twine, yardstick, pencil, paper.

Investigation

If some group finishes early maybe they would like to try to find the largest tree in the area.

Extension

Take the average of each group to the nearest hundredth and see what result you would obtain when you average (arithmetic mean) the results together.

Reference

Dictionary definition of pi.

Evaluation and Addendum

Check their understanding of circumference and diameter. Ask questions about pi and see if they have the correct concept. See if they rounded off numbers correctly in the calculations.

Concept to be Developed

Estimating Inaccessible Distances

Procedure to follow

A distance that cannot be measured or estimated by pacing--for example, the width of a stream--can be estimated with the aid of a protractor or an inexpensive transit by using the following procedures.

Note: See Fig. 1

1. Drive a stake or place a stone at a selected point, A. sight from point A to point B (the location of a rock, tree or some other object easily sighted on the opposite side.) Use a string pulled taut to mark this line of sight AE or AE'

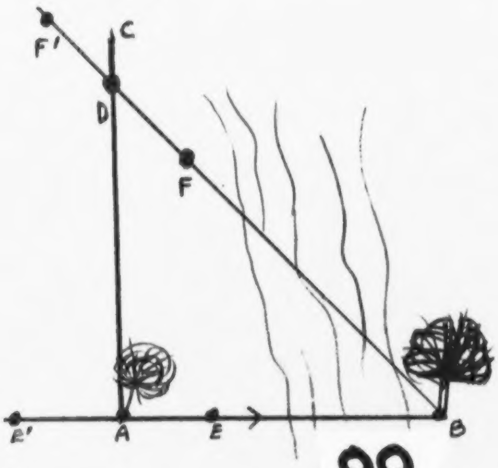
2. Cross string at a right angle. (Use protractor or inexpensive transit to determine the angle.) Set up a line (AC) perpendicular to (AB).

3. Walk along this perpendicular line (AC) until you come to point D, where the line of sight from D to B (DF or DF') will make an angle of 45° with line DA. (A large 45° - 45° - 90° triangle can be used). Use a string to mark this line of sight, and check the 45 - degree angle with the protractor, inexpensive transit, or large 45° - 45° - 90° triangle.

4. Measure the distance DA. This distance will be the same as AB, because triangle ABD is a right isosceles triangle. Why?

Materials Necessary for Activity

Protractor, inexpensive transit, and Large 45-45-90 triangle, steel tape measure, string.



Extension

Before the work outdoors, you should study an isosceles right triangle and its properties.

It might be very convincing to the students to use this method later on the playground or softball diamond where they can check the accuracy. For what reasons is this an approximate measurement?

Reference

Curriculum Enrichment Outdoors, Hug and Wilson, Harper and Row, P. 82 Project 120.

Concept to be Developed

Observing Geometric Objects in Nature.

Procedure to follow

Find a suitable spot and stop and ask students what geometric objects they can name in nature. **Examples:** Lines, circles, angles, cylinders, and etc.

Extension

Discuss other geometric figures and where you find them.

OUTDOOR EDUCATION

SOCIAL STUDIES - Activity Periods

1. Trail trip - explaining the history of camp, Crow and old Beauty Railroad.
2. Weather study techniques.
3. Map reading - Compass and Orientation.
4. Conservation - water and air pollution.
5. Topography of camp.
6. Patriotism.
7. Participation in government of the camp community

Alternate lesson plans for inclement weather.

1. Use of Leisure Time.
2. You and the Law (Crime and Lawlessness).
3. Prejudices.

Pre-camp planning

1. Awake the child's awareness of his dependence upon the out-of-doors.
2. Study the effects of (geographical and political) history upon your region.
3. Begin to discover and discuss what social attitudes, understanding, and behavior will probably be necessary in the camp situation.

Follow-up of the camping experience

1. A topographic map of the Outdcor Education Complex.
2. Select a panel and have a discussion on group living.
3. A study of local history. Have some of the children to do research.

others interview residents, and others resource people to be brought in to speak to the class.

4. Do a study unit around the theme "How Can Man Better Preserve the Out-of-Doors?"

WHY SOCIAL STUDIES OUTDOOR'S

I. An Outdoor Education Program provides these benefits for the student.

1. Realization that teachers are human.
2. Opportunity for teacher and students to know each other better.
3. Provides the relationship for student to see the difference between symbolic and the actual (reality).
4. Learning is easier when a multisensory approach is used.
5. Learning is more enjoyable.
6. Learning is retained longer.
7. Given an opportunity and feeling he can learn on his own.
8. Students are released from boredom of routine in the classroom.
9. Students learn their ideas have basis and value. (A success experience)
10. Students learn to live together and accept each other.

If a teacher wants these above things to happen, then the teacher must plan for them to happen.

II. Society's needs which can be met by outdoor education.

1. The need for creative living;
2. The need for physical and mental fitness;
3. The need for roots in the soil;
4. The need for spiritual satisfactions.

A close examination of these needs will offer some clues for better educational programs that relate to the use of the outdoors.

III. Teacher job in outdoor education.

1. Create a climate for and desire to learn.
2. Sincere interest in the individual.
3. Prepare them to be productive.

4. (Physical; mental; social; and emotional - to make the child productive in these four areas.)
5. Self motivation to arise above their present environment.
6. Determine their needs.

One Hour Discussion

"Rainy Day"

Concepts

Crime and Lawlessness

I. Who's to Blame the (A) Police or the (B) Public?

II. (A) Are crime and lawlessness on the rise in the U.S. or (B) Are public fears of crime exaggerated?

III. Have U.S. Supreme Court rulings taken too many powers away from the police?

IV. How much police power is necessary to control crime without encroaching on the civil rights or privacy of law-abiding citizens?

V. Is it a Crime?

VI. The Consequences of a Criminal Record.

VII. Juvenile Delinquency and Youthful Offenders.

Explanation and Procedure

Group Discussion:

I. (A) Police

1. Confidence in the ability of police to control crime seems to depend a lot on whether the person being asked is a member of the white majority or of a racial minority group.

2. Charges of "Police Brutality" against members of minority groups.

3. "Police-Community Relations" in the U.S. can stand improvement.

(B) Public

1. They don't want to get involved.

2. Public apathy.

3. Carelessness.

4. Public's hate towards policemen.

II. (A) Yes-According to the (UCR) annual report - In seven magor catagories - These are: (1) Murder and Non-Negligent manslaughter, (2) Forcible rape; (3) robbery; (4) aggravated assult; (5) burglary; (6) larceny of $50.00 or more; (7) motor vehicle theft.

1966 - 11.4% rise in crimes in these seven areas.

(B) In Boston and Chicago, 43 percent of the people said they stayed off the street at night. 35 percent said they do not speak to strangers any more. 20 percent said they would like to move to a new neighborhood all because of their fear of crime and violence.

Recent statement by public officials at all levels of government have begun to reflect a mounting public uneasiness over crime. "Fear haunts . . . too many Americans Communities" said President Johnson. "It assails us all, no matter where we live, no matter how much we own. We fear for our person, we fear for our property, and we fear for our privacy."

According to the Presidental Crime Commission: "There is much crime in America, more than ever is reported, far more than ever is solved, far too much for the health of the nation."

We as citizens must conquer fear and help combat crime.

III. Senator John A. McClellan (D. Ark.) Chairman of the Subcommittee on Criminal Laws and Procedures agrees: "I believe that the broad, sweeping advantages, which have been given to criminals in many of these Supreme Court decisions, have certainly militated against and . . . done great injury to the rights of society to be protected," he says.

Other observers however, have strongly supported the Supreme Court rulings. Some have argued that the Court has done nothing except to spell out the Constitutional rights of individual and that to use unconstitutional means to enforce laws is plainly a contradiction of terms.

IV. On the other hand, there are those calling on the police to take tougher action against lawlessness in the streets. "There is a war in the streets between the lawless and the law abiding citizens," said Miami (Fla.) Police Chief Walter Headley.

On the other hand, there are those who contend that police thoughness, particularly in get to areas, will only breed counterviolence. Attorney General Clark argues that crime is mainly caused by social and economic conditions and that harsh police measures may actually increase lawlessness by angering minority groups.

V. Inexperienced and thoughtless young people occasionally become involved in serious situations because they have recklessly ignored rights of others. Often what they consider a prank or a "good gag" is actually a crime which can have serious consequences. Here are some examples of actions that started out as youthful escapades, but really were crimes:

Larceny (taking another's property)
Joy Riding (unlawful taking of vehicle)
Forgery and Uttering
Breaking and Entering
Burglary
Shoplifting
Reckless Driving
Robbery
Carrying Dangerous Weapons
Accessories and Accomplices

VI. The Consequences of a Criminal Record.

Once a person has been convicted of a crime, he has a criminal record.

A single act of recklessness, irresponsibility or animal spirits can affect your whole life. Sometimes the punishment ordered by the Court, such as imprisonment or fine, is not the most serious consequences of the criminal conviction. For instance: Felony conviction bars one from Commission in Armed Forces, Voting, Practice of Law or from following any professions or occupations for which a license must be obtained.

Many business requires employees in positions of trust to be bonded. Insurance Companies usually refuse to bond anyone who has been convicted of a crime.

Before a person will be accepted for enlistment in the armed forces or our country law enforcement agencies are asked whether he or she has a criminal record, and that person may be rejected if the record is particularly bad.

VII. Laws are designed not only to govern the conduct of adults but apply equally as well to children.

Some laws are designed especially for the protection and education of children. Among these are laws requiring school attendance, laws employment of children in work which might be dangerous to the health of a child, and laws determining the age at which a child may drive a car, beer or liquor, and marrying without the parents consent.

West Virginia has separated courts for youthful offenders which are called Juvenile Courts. Any child under the age of 18 who has broken the law is brought before the Juvenile Court, unless the child is charged with committing murder on certain other very serious crimes.

If child is 16 or over Court can refuse to hear case, if it is a serious crime.

Materials

Chalkboard and chalk, pencil and paper.

Articles used in committing a crime and articles taken by the offender.

Investigation

Practically the only available crime statistics on a national basis are the Uniform Crime Reports (UCR) issued each August by the Federal Bureau of Investigation.

Extension

Classroom-discussion and Exercise.

Student to Report on Crimes committed in Raleigh County.

(a) By Adults
(b) By Juvenile's

Discuss State and National Crime growth rate.

Reference

(1) Barnes & Teeters, New Horizon in Criminology, Prentice Hall Publishers

(2) You and the Law, Provided by Capitol Kawanis Club, Charleston

(3) Senior Scholastic - Teacher Edition, February 15, 1968.

(4) The Challenge of Crime in a Free Society; Superintendent of Documents U.S. Gov. Printing Office, Washington D. C. 20402 - $2.95

Student Reference

(1) Senior Scholastic - February 15, 1968.

Evaluation and Addendum

1. Group participation
2. Informative
3. Constructive
4. Training of Character

Concepts

Map Reading

Objectives - To teach class a means of locating unknown points by the use of intersection and resection.

Reasons - To give class a basic knowledge of map reading and means of locating ones self if lost. Also teach class how to orient a map.

Procedure

Explanation

1. Intersection - The location of an unknown point by successively occuppying two positions and sighting on the unknown point is called intersection. It is used to locate features that are not defined on the map. The two methods of intersection are the map and compass method and the straight-edge method. (Two methods covered in students investigation.)

2. Resection - The location of the user's position by sighting on two known features is called resection. Resection can be done with or without a compass. (Students Investigation)

Materials

Topographic Maps of 4-H Camp and surrounding area. (Enough for entire group).

Several Compasses, straight-edges (Rulers or Card board), pencils, chalkboard and chalk.

Investigation

1. Intersection

(a) Maps & Compass Method

1. Orient the map by using the compass.

2. Locate and mark your position on the map.

3. Sight on the unknown position. Draw a line on the map from your position toward the unknow point.

4. Move to another position, locate this position on the map.

5. Sight on the unknown position and draw a second line on the map from your position to the unknown point.

6. Where the two lines cross is the location of the feature.

(b) Straight-edge Method

1. Orient the map on a flat service by the inspection method.

2. Lay a straight-edge on the map with one end at user's position as a pivot point and rotate is sighted along the edge.

3. Draw a line along the straight-edge.

4. Repeat 1-2-3- from another position.

5. Where the lines cross is the location of the unknown point.

2. Resection

(a) Orient the map and select two outstanding features on the ground which can be identified on the map.

(b) With a compass, an azimuth to each of the known points on the ground, convert these azimuths to grid azimuth and then back azimuths.

(c) From the two known locations on the map plot these two back azimuths until the lines resect.

(d) The point where the lines cross is your location.

Vocabulary

1. Intersection - The location of an unknown point by successively occuppying two positions and sighting on the unknown point is called intersection.

2. Resection - The location of the user's position by sighting on two known features.

3. Orient - A map is oriented when its north points and all map lines are parallel to their corresponding lines on the ground. Use of compass best way

to accomplish this.

4. Base Line - Is a zero point from which an azimuth can be found if it is used with a line of direction.

5. Direction - Is defined as a straight line along which any thing may be aimed, pointed, or moved.

6. Azimuth - An azimuth is defined as a horizontal angle expressed as degrees measured from a clockwise angle, from a base line.

7. Grid System - Consists of two sets of parallel straight lines intersecting at right angles and forming a series of squares.

8. Grid Lines - Each line of the grid system has a number and these numbers are used to identify the individual grid squares.

9. Topographic Map - Is a graphic representation of selected man made and natural features of a part of the earth's surface plotted to a definite scale. The distinguishing characteristic of a topographic map is the portrayal of the shape and elevation of the terrain.

10. Map Scale - Expresses the size relationship between the features shown on the map and the same features on the earth's surface. This is generally expressed as ratio or fraction - 1:24,000 or 1/24,000. The numerator, usually; represents map distance; the denominator, a large number, represents ground distance. Thus the scale 1:24,000 states that any unit such as 1 inch or 1 foot on the map represents 24,000 of the same unit on the ground.

11. Map Symbols - Are the graphic language of maps their shape, size, location, and color all have special significance.

Extension

Classroom-Discussion and Exercise, Scouts-On Camping Trips and Hikes, 4-H Club and Other Clubs, Compass and Map Reading, Valuable Knowledge.

Reference

Teacher

1. Drummond, Dorothy Weitz-Teacher's Addition; Kohn, Clyde F., *The World Today* 3, pp. 34-47.
2. U. S. Department of the Interior-*Geological Survey Topographic Maps*.
3. *Map Reading*, F M 21-26, U. S. Department of Army.
4. *Webster's Seventh New Collegiate Dictionary*.

Children

1. *The World Today* - Chapter 3, pp. 34-47.
2. *Webster's Seventh New Collegiate Dictionary*.

Evaluation and Addendum

Observation of group

1. For self-reliance.
2. Attitude.
3. Involvement.
4. Skills.

Quiz students orally and dis[illegible]ion.

ASTRONOMY

Objectives

1. To develop an understanding of solar system and space travel.

2. To develop an appreciation and respect for astronomy.

3. To develop an understanding of how man can aid or harm nature in her many wondrous processes.

4. To help the student to develop the past, present, and future of space study relating it to astonomy.

1. THE SUN

CONCEPT: Our solar system is comprised of all those heavenly bodies that orbit around the star we call our sun.

BACKGROUND INFORMATION: The sun is a large star composed of gases burning at very high temperatures. The main, inner portion of the sun is known as the photosphere. Here the temperature is about 11,000 degrees F. The chromospher is a layer of gases forming the outer portion of the sun. The corona is a halo of gases surrounding the sun. Sunspots are whirlpools of gases caused by surface disturbances. Prominences are bright tongues of burning gases that shoot out from the surface of the sun or many miles. The sun has a group of nine planets and various other bodies that orbit around it.

STUDENT ACTIVITIES

1. Find out about the composition of the sun.
2. Find out how sunspots affect radio reception on earth.
3. Find out how scientists observe the sun.

2. SOLAR ENERGY

CONCEPT: Life on the earth depends on the energy from the sun.

BACKGROUND INFORMATION: The sun is our main source of light and heat energy. The heating of the earth's surface by the sun is one cause of our weather and climate. Light from the sun is used by green plants in photosynthesis to manufacture food. Meat eating animals feed on other animals that may feed on plants. The coalfields of today were formed from ancient swamp forests which received light from the sun. Man, a consumer, uses some plant products for foods and fuels. Therefore the sun's energy directly or indirectly helps man to live.

STUDENT ACTIVITIES

1. Find out why oil and coal be called fossis fuels.
2. Find out more about the process of photosynthesis.
3. Find out the part or role the sun's plays in the water cycle.
4. Trace the food energy from a hot dog to solar energy.

3. THE EARTH

CONCEPT: Earth the third planet in distance from the sun, is flattened at the poles and lightly bulged at the equator.

BACKGROUND INFORMATION: Earth, about 93 million miles from the sun, is about 7900 miles in diameter. It takes 365¼ days to complete one revolution around the sun and 24 hours to complete one rotation on its axis. Revolution and the tilt of the earth cause the earth to have four different seasons. Rotation causes the earth to have periods of daylight. The two motions of revolution and rotation cause the earth to be slightly flattened at the poles and slightly bulged at the equator. The earth has one natural satellite the moon. We know more about this planet than any other planet in our solar system (WHY)?

4. THE MOON

CONCEPT: The moon is a natural satellite of the earth and revolves around it once every 29½ days.

BACKGROUND INFORMATION: The moon is the earth's only natural satellite. The moon has a diameter of about 2000 miles and is about 1/80th of the weight of the earth. The pull gravity is much less on the moon compared to the earth. It has no natural light, but reflects light from the sun. Because it has no atmosphere, the surface is very cold in the shadows and very hot in the sunlight. The surface is covered with mountains, craters, plains, and ridges. The moon appears to change its shape. This is caused by the different size of reflected surface area visible from the earth as the moon orbits around the earth.

STUDENT ACTIVITIES

1. Find out how the Greek scientist Hipparchus measured the distances to the moon.

2. Find out what information has been discovered about the Moon's surface by Luna.

3. Find out why we see only about 59% of the moon's surface.

5. TIDES

CONCEPT: Tides are periodic rising and falling of oceans due to the gravitional pull of the moon and sun.

BACKGROUND INFORMATION: The moon causes a gravitional pull on the earth. The waters of the ocean respond to this pulling more readily and bulge out away from the earth. This causes a high tide. This also pulls on the solid part of the earth and pulls it away from the water on the opposite side. As the earth rotates, these bulges of water travel around the earth's surface from east to west causing two alternating high and low tides within 24 hours. At the time of the new moon or full moon, the earth, moon, and sun are in line and usually high tides, called spring tides result.

STUDENT ACTIVITIES

1. Find out about the high tides in narrow harbors such as the Bay of Fundy and Cape Cod.
2. Find out about animals that live tidal pools.
3. Find out why tide information is important to ocean liners.

6. THE SEASONS

CONCEPT: Because of the earth's tilt and it revolution around the sun, the earth has different seasons.

BACKGROUND INFORMATION: The earth's axis is tilited at an angle of 23½ degrees and points to the North Star. When the Northern Hemisphere is tilted toward the sun, it receives the stronger, direct rays of the sun for a longer time and has the season of summer long days and short nights. When the Northern Hemisphere is tilted away from the sun it receives the weak, indirect rays of the sun for a shorter time and has the season of winter - short days and long night. In spring and fall, the earth is tilted neither toward nor away for the sun.

STUDENT ACTIVITIES

1. Look up about 24 hours of daylight and 24 hours of darkness at the poles.

2. Find out about the equinoxes.

7. ROCKET LAUNCHING

CONCEPT: The equipment and time needed to launch a space vehicle depends on the vehicle's size and mission.

BACKGROUND INFORMATION: Weeks before a scheduled launching, a truck carries the rocket to a launching pad. A crane lifts the rocket onto a stand called the launch pedestal, between the legs of a service structure. The launch pedestal has steel arms that support the rocket and hold it down until lift off time. Worker ride elevators in the gantry to reach any part of the rocket and payload. In the launch control center engineers check various instrumetns and recorders that tell them whether the vehicle is ready for launching. Protected by thick, concrete, they watch the pad by means of television and periscopes. The rocket engines is now ignited. A set of arms on the launch pedestal holds the vehicle until it builds up enough thrust to lift off the pad. Three ... two ... one ... zero ... the arms release the rocket, and it rises into the heavens with a deafening roar.

STUDENT ACTIVITIES

1. Find out about our launching sites at Cape Kennedy and Vandenberg Air Force Base in California.
2. Find out about space stations.
3. Find out about the Russian and American astronauts' walks in space.
4. Find out about astronaut selection and training.
5. Find out about the astronauts space suit.

8. TYPES OF SATELLITES

CONCEPT: Scientists have launched a number of artifical satellites in orbit around the earth. These satellites send us much information from space.

BACKGROUND INFORMATION: Rockets are used to send a satellite to the proper height and then acceletate it to the proper speed and direction so that it will orbit around the earth. The point of the orbit fartherst from the earth is called apogee; the nearest point is the perigee. The satellite will remain in orbit when the gravitional pull of the earth on the object is center balanced by its forward speed. The speed necessary to keep the satellite in the constant Fall around the earth at an altitude of 300 miles is 17,000 miles per hour. The United States put its first satellite into orbit on January 31, 1958. Satellites are providing us with knowledge of space and aiding our world wide communication systems.

9. PROJECT MERCURY AND GEMINI

CONCEPT: Project Mercury placed the first American in space. Project Gemini placed the first pair of Americans in space for a prolonged time and developed techniques for orbital renedezvous and docking.

BACKGROUND INFORMATION: The purpose of Project Mercury was to orbit a manned spacecraft, investigay man's reaction to, and abilities in, space flight, and recover both man and space craft safely. All purposes of Project Mercury were successfully fulfilled in addition to laying a sound foundation for future manned space flights. Astronaut Alan B. Shepard, Jr. was the first American rocketed into space (May 5, 1961). The first American astronaut to orbit the earth as astronaut John H. Glenn Jr. (Feb. 20, 1962). The purpose of Project Gemini is to determine man's performance and behavior during prolonged space flights of as much as two weeks.

Soil Community

Concepts

Soil is that part of the regolith that supports plant life. The main constituents of soil are sand, clay, and other mineral materials derived from decay of rock, plus decomposed organic matter or humus.

Plant roots, bacteria, burrowing animals, climatic factors, (especially rainfall and temperature changes) and acids from decaying vegatation are the agents involved in converting rocks into soil.

The mineralology of the soil parent material is a major factor in determining the type and distribution of plant species.

Topsoil is the organic relating with the inorganic. It is a community of insects, plants, animals, decaying matters, water, oxygen and minerals, each affecting the other.

Investigations

What are the characteristics of the soil at the outdoor school?

How is soil formed?

What can we find in soil?

How are plants related to soils?

Materials

Soil augers, rock hammers, hand lenses, soil test kits, shovels and soil collection bottles.

Procedure

Compare the soil cover of the earth to the thin skin of a soap bubble. Although both coverings are thin, they are the most important parts.

Even though the skin of the earth is very thin, it has taken millions of years to form. Many kinds of changes have been caused by different forces.

What would happen if boiling water was poured on a very cold glass? What would happen if cold water was poured on a very hot glass? What do you think might happen to rocks, when there is extreme changes in temperature?

Feel rocks which have been exposed to the sun. Where did the heat come from? Ask the children to feel a rock at night or compare rocks that are located in the shade with those exposed to direct sun.

Extreme heat and cold can break rocks in the same way that hot or cold water can break glass.

Rub two sandstone rocks together for several minutes, or crush small sandstone rocks with a hammer. Examine the rock particles with a hand lens. Can moisture penetrate into a sandstone rock? What happens when the moisture freezes? Water expands by about 10 per cent of its volume when it freezes into ice. The more often the ice melts and then refreezes, the more often will this frost action be able to split the rock.

Turn over a spadeful of soil. Examine the soil particles with a hand lens. Can you find particles similar to the rock particles? How do you explain this?

Walk to Little Beaver Creek and observe the rocks in the stream channel. Why are some rocks smooth? Can you think of other forces that might change rocks into soil?

Locate plants growing in a rocky area. Can you find small grayish plants (Lichens) growing on rocks?

How do Lichens help break down the rocks to form soil? Can you find a tree growing on a rock? What affect do tree roots have on rocks?

Look for small shallow bowls or depressions containing soil, in rocks. What plants are able to survive in the additional soil? Relate the type of plants to the amount of soil.

Observe a rock cut. Do you see any difference in the soil layers? Most soils have three layers, the topsoil, subsoil, and parent material. How can you tell where one layer stops and the other layer starts?

The top layer, (topsoil) contains plant food needed to supply the nutritional requirements of plants. There are many elements needed to provide these needs.

Some are supplied by man in the form of fertilizer. Some are supplied by nature such as plant and animal remains that are returned to the soil.

Death begets life. The fallen tree enriches the soil and paves the way for other plants. The bird eating the insects helps protect the life of other plants. The death of an animal provides life for other animals. What would happen if everything lived?

Use a soil auger to obtain another profile of the soil. What affect has exposure to weathering had on the soil at the road cut?

Turn over a spadeful of soil in the following places:

1. In a field.
2. In a rocky area.
3. In a forest.
4. In a decayed stump.
5. In a stream bed.
6. In a path.

What can you find in the soil? Tally your finds (use your hand lens).

1. How many insects and how many kinds? (Living and Dead)
2. How many animals or animal signs? (Living and Dead)
3. How many plants? (Living and Dead)
4. Estimate the water content of the soil.
5. Is the soil loose or compacted, granular or powdery?

6. Is there a difference in color?

7. Does it feel or smell differently?

8. What can we tell about the soil by just looking, feeling and smelling? Can we judge crop fertility potential by these methods?

Extension

Test the different types of soil collected to determine the pH factor. Most plants need a soil that is not to acid or to alkaline.

References

Antioch Outdoor Education Center, Yellow Springs, Ohio, The Staff Handbook

Conservation Curriculum Improvement Project, South Carolina Department of Education, Geology - An Introduction Robert L. Bates and Walter C. Sweet, The Ohio State University.

Downslope Movement Hike

Concepts

The force of gravity is universally present and is constantly forcing materials to move downslope under their own weight. The valley below Vesper Knoll was formed due to unstable masses of earth material moving downward under gravitational force. The most important factor on promoting downslope movement is water.

Procedure

Hike to the abandoned quarries and Little Beaver Creek. Look for evidence of downslope movement.

Investigation

What materials are found at the base of the road quarry? Small broken rock fragments at the base of the quarry are called talus. Can you find evidence of downslope movements along the road banks? (Look for creep and rockslides) At Little Beaver Creek, note the shape of the valley. How was the rock removed to form the valley? (The bulk of the rock removed to form the valley was fed to the stream by slump, creep, talus, accumulation and other movements that bring material downslopes) Look at the valley walls. Can you find evidence of rock falls, rock slides, or creep? How did the rocks get into Little Beaver Creek? Is the creek flowing on solid rock? If so is it being eroded deeper? By eroding its channel a stream deepens its valley and increases the slope of the valley walks, thus causing an increase in downslope movements. What evidence of downslope movement can be found at the quarry below Vesper Knoll?

Dig into the regolith below the top of the quarry. How large are the displaced rocks? How has men contributed to the downslope movement of materials? When does most downslope movements occur?

Extension

Most downslope movements occur after heavy rains and during periods of extreme frost wedging. Other examples of downslope movements are retaining walls that are pushed away from the vertical, fence posts tilted downhill, and old gravestones all leaning in the same direction.

Downslope movements of rock and regolith are major problems for highway engineers.

Soil Conservation

Concepts

The Universe is in constant change.

Grass and other vegetation retards the erosion of soil.

Proper conservation practices such as construction of terraces (to reduce slope steepness and length) cultivation in contour belts (to reduce length of slope exposed to tillage) planting of trees and cover crops (to reduce surface erodibility and increase infiltration) building check dams in gully floors (to induce gully sedimentation and filling) will help conserve the soil.

Transported or eroded soil materials may be found in Little Beaver Creek or at the base of slopes.

Investigation

What happens to soil that is not protected by proper conservation practices?

Materials

10 - 2 gallon containers.

Procedure

Hike to the elevated soil demonstration plots.

Pour water slowly upon the soil demonstration plots. Collect the water that is not absorbed by the soil. Be sure to add the same amount of water to each plot. Enough water should be added to saturate the soil and allow some to drain into the collection containers. Measure the amount of water that has drained through the soil and deduct it from the quantity added.

Make a table to show your results:

*Soil	Amount of water added	Collected	Held by the soil
A			
B			
C			
D			
E			

*A - Soil Plot - No Vegetation, Unconsolidated.

B - Soil Plot - No Vegetation, Compact, Rocky.

C - Soil Plot - Forest Vegetation, Living and Dead organic matter.

D - Soil Plot - Grass Vegetation.

E - Soil Plot - Strip Cropping, Contours, Sod water ways.

1. What happened to the unprotected soil?
2. What happened to the water in the grass plot?
3. Which plot absorbed the most water and had less run off? In what ways can run off water be controlled?
4. What is the reason for the quantity of water that drains through the soil being different?
5. What properties determine how much water a soil will hold?
6. How can the water holding capacity of a soil be increased?
7. How can Erosion be prevented?
8. How can the prevention of Forest Fires help prevent soil erosion?

Compare the sediment remaining in the containers. Which plots had the greatest amount of erosion? The smallest amount?

Can you find evidence of erosion at the road cut? At the Quarry?

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Walk to Little Beaver Creek. Can you find transported soil sediments in the stream channel? Where does the most sediment deposition occur? In swift or slow moving water?

What causes sand bars in rivers? Where does the sand on Ocean Beaches come from?

If possible observe Little Beaver Creek after a heavy rain. What evidence of soil transportation can you observe? What makes the water muddy?

Erosion may be due to water falling during a rain at a rate faster than the soil can absorb it. As excess water runs off, it takes soil with it. Erosion may also be due to wind blowing the soil away.

The United States Soil Conservation Service, West Virginia Department of Natural Resources, Civic Organizations, Industry and farmers are working to prevent soil erosion. It is everyone's responsibility to do all he can to use our soil in such a way that it will not be subject to loss by erosion.

References

The Staff Handbook, Antioch Outdoor Education Center, Yellow Springs, Ohio, Conservation Curriculum Improvement Project, South Carolina Department of Education.

Concepts

All rocks do not have the same hardness.

A rock is harder than the one it will scratch, and softer than the one by which it is scratched.

Investigation

What is the hardness of rocks that are found at the outdoor school?

Materials

Containers for collecting, pennies, nail files or knife blades, and glass plates.

Procedure

Collect the different types of rocks within the camp area.

Determine the relative hardness of the rocks, by scratching the rocks on each other.

Try to scratch all the rocks with your thumb nail. Group those that can be scratched by thumb nail together.

Try to scratch the remaining rocks with a penny. Group these together.

Use a knife blade or file and try to scratch the remaining rocks. Put these rocks into another group.

See if the remaining rocks will scratch glass. Select the hardest rock collected.

Extension

Certain common objects are suitable for approximating the hardness of rocks. The fingernail is considered as having a hardness of 2.5. A copper cent has a hardness of 3. A brass pin has a hardness of 3.5. Window glass 5.5, a good knife blade 6 and a hardened steel file 6.5.

Concepts

Rocks have different cleavage, fracture, luster, texture, and minerals.

Investigation

What are the physical properties of rocks found at the outdoor school?

Materials

Rock hammers, hand lenses, and streak plates.

Procedure

Break several different rocks. Describe the appearance of the broken surface. Do any of the rocks break with uneven, irregular, shell-like, conchoidal, splintery or fibrous fractures. Group similar fracture types. What is the cleavage pattern of the broken rocks? Group rocks with similar directions of cleavage.

What is the texture of the rocks? Are they fine grained, course grained, mixed grained, smooth, glassy or broken? What is the most common texture?

Can you find rocks with different luster? (Note the broken surface) use your hand lens. Do some parts (minerals) of the rocks appear to be metallic, vitreous, glassy, waxy, resinous, silky, dull, earthy, greasy, or pearly?

Group the rocks according to the different colors. Use a freshly broken surface. What is the streak (color of the rock powder) of the rock? Is color a good identifying characteristic?

Extension

Cleavage is the tendency or characteristic of most rocks to break along certain difinite planes.

Fracture is the appearance of a rock surface when it breaks along other than cleavage planes.

Additional characteristics would include taste, odor, feel, magnetic, crystall forms, flexibility, brittleness, transparent, translucent, opaque, and electrical conductivity properties.

Concepts

Calcite is a common mineral which is the principal constituent of limestone. Calcite can be identified by a simple chemical test.

Investigation

What rocks at the outdoor school contain calcite, or are limestone?

What happens when dilute hydrochloric acid comes in contact with calcite?

Materials

Rock hammers, hand lenses, and small bottles of dilute hydrochloric acid?

Procedure

Break several different rocks or use broken rocks from previous investigations. Place a drop of dilute hydrochloric acid on the broken rocks. Describe the reaction. What gas is given off?

Extension

What was the effect of the acid on sandstone?

Limestone will react with cold hydrochloric acid, but dolomite, a carbonate of calcium and magnesium reacts with warm acid only.

Sedimentary Rocks

Concepts

Sedimentary rocks are rocks that are found by the cementing of sediments derived from other rocks. Sedimentary rocks generally have a marked parallel structure called stratification. Each layer or bed of sedimentary rock is laid down in water, upon those layers already deposited, and there occurs a frequent change in color, texture, or minerals as one layer is added to another. Sandstone is a sedimentary rock. Sandstone rocks have a variety of uses, depending upon the mineral composition, and the nature of the bond which cements the particles together.

Procedure

Hike to abondoned rock quarry near the Little Beaver Lake Highway.

Minerals

Shovels, Burton compass, hand lenses, hammers, screen sieves, streak plates, MM ruler, and dilute hydrochloric acid.

Investigation

What is the dominate rock at the outdoor school. How are sandstone rocks formed? Describe the appearance of the exposed rocks at the quarry. What is the grain size? (Use hand lenses) sandstone grains range in size from 1/16 to 2 millimeters. Sandstone rocks are classes as fine, medium, or course grained depending upon the diameter of the grains. What is the hardness of the rocks at the quarry? What is the streak?

The process by which sand is converted to sandstone is cementation. Four common agents of cementation are calcium carbonate, quartz, iron oxide, and clay. What is the cementing agent at the rock quarry? Sandstone cemented with calcite effervesces in dilute hydrochloric acid, those with quartz cement are very hard and tough, those containing iron oxides are yellow, red, or brown color. Every sandstone consists of two components, the clastic grains, and the cement that holds them together. Can you determine from evidence at the quarry the use made of the removed sandstone? What is the bedding plane? Were the rocks deposited parallel to the horizon at the time of deposition? What is the dip and strike of the exposed rock? Is tilting or inclination evident?

Extension

Walk to Little Beaver Creek and look for evidence of deposition of sediments. Select an area of relative stream calm. What size sediments are present? (Use shovels and screen sieves to determine sediment size.) Describe the sediments collected. Use a hand lense for closer observation. Can you find fragments of rocks similar to the sandstone at the quarry? Find an area of the stream where the velocity is rapid. Compare sediment deposition with the calm area. Look for an area where the stream has overflowed. What type of sediments are found on the top of the banks or flood plain? Sandstones are formed in river channels, on flood plains, in dunes built by wind, but the majority of sandstones were laid down in the sea millions of years ago.

Concepts - The Theory and Development of Music

1. The story of Music, the most beautiful form of sound.
2. Nature, the first musician.
3. The development of musical sound.
4. The history and development of methods of recording music.
5. Modern theory.
6. Modern theory applied.
7. Music as a scientific and mathematical adventure.

General Procedure

Pre-Camp

1. Cover the material in Music Fun Books I, II A Kenworthy Activity Book.
2. Use the regular textbooks to supplement and give meaning and usage to the activity book.
3. Practice writing music.
4. Practice finding Pitch for each key signature.
5. Read the story of the development of music.

Camp

1. Read and sing songs from Camp Song Book.
2. Make a list of the sounds of nature heard each day.
3. Play musical charades. Using the sounds of nature for the camp mates to guess.

Post Camp

1. Interpret vocally, the sound of nature.
2. Write the sounds on paper.

Materials

Regular textbooks, staff paper - note paper, records, record player, the Kenworthy activity book for each child.

Investigation

Pre-Camp

1. Listen to recordings of the sounds of nature.

2. Arrange sounds into vocal groups comparing them to the human voice. (Type, range, quality.)

3. Discuss reasons for classification and use examples who would sing the parts of crickets, birds, elephants, rain storm, wind, volcanic eruptions, beautiful peaceful meadows and streams etc. Using the human voice are those of instrument.

4. List, Review, Musical notations.

Camp

1. Discuss and interpret sounds of nature that have been heard each day.

2. Play musical charades, camp mates guess what you are sounding and acting out.

3. Divide into groups - each group portrays a scene from nature with actions and sounds. Camp mates guess.

4. Play Musical Bingo.

Post Camp

1. Write the sounds of nature on staff paper.

2. Review musical notation where needed.

3. Discuss dynamics and incorporate into writing.

4. Evaluate the recordings from pre-camp experience discussion as to authenticity of sound.

Extension

Nature's Orchestra by Ruth J. Rittenhouse.

Nature has many fine musicians in her orchestra, the birds being most popular, of course. But many of the tiny inhabitants of the field and forest are orchestra members also and play on their instruments night and day all the summer long.

The long-horned grasshopper or true katydid is the leader of the band. He possesses two sets of wings, an outer set, which attend to the business of aeroplaning him about, and an inner set which are for no other purpose than to play his fiddles and make his music. Near the base of his inner wings are some strong veins and nerves, and when he moves them they rub together, making a strong sound, sometimes called "grasshopper's fiddling."

The common green grasshopper is another fine player. His fiddle is one wing, and he uses his hind leg for a bow. Can you imagine that? On the leg is a line of little bead-like attached to lumps, on each of which grow some tiny fine hairs. When Mr. Grasshopper pulls his hind leg over his wing his song trills out on the summer air, and he considers it a very beautiful song. Mrs. Grasshopper goes through all the same motions but she cannot produce a single sound. However, she never seems to grow discouraged but keeps it up night after night.

The cricket's music is a shrill tune at night but a different tune during the day. Sometimes he changes his note even when the clouds darken the face of the sun for a moment.

Some insects beat drums when they want to make music. The seventeen-year-locust has his drum fastened to his abdomen. It is firm and tight and makes a sound, like the beating of a tin pan, which will drown out many other songs.

The death-watch beetle also beats his drum as he pushes into the woods. There is another beetle called the drummer beetle because he makes a drum-like sound also. A great many many others in nature's orchestra have musical arrangements that make us think of fiddles or drummers. Perhaps the very first violins made by man were suggested by these queer little players in nature's orchestra.

The Music Makers by Edith D. Turner

Possible copyrighted material deleted.

In The Beginning, Young Keyboard Jr. The Magazine for music appreciation

Possible copyrighted material deleted.

Pythagoras and the Scales by Mary Finch Harvey

Possible copyrighted material deleted.

Evaluation and Addendum

Pre-Camp

1. Evaluations provided for in Kenworthy Activity Book.
2. Evaluate from standpoint of interest and participation.
3. Use musical flash cards for drill.

Camp

1. Evaluate from standpoint of interest and participation.
2. Interpretations in games charads singly and in groups.

3. Knowledge of symbols in Musical Bingo.

Post Camp

1. Test on Musical Notations for knowledge of theory. .
2. Check awareness of sounds and scenes around them every-day.
3. Check for improvement in ability to listen and concentrate.

References

Recordings

Adventuring a Preambulator

Carperter

Donkeys Serenade

The Carnival of Animals

The Science Recordings In Office

Regular Classroom and Camp Music Books, 7th Grade

Set of Musical Bingo

Set of Musical Flash Cards

The Kenworthy Activity Books I or II According to need.

Outcomes

The student should have an understanding of the historical and the technological development of musical notations. He should be able to site read and sing with any group. He should know his own voice range and quality. He should recognize tone and quality and be able to classify them.. He should be more willing and anxious to participate, since his own interpretations cannot really be questioned or criticized. He should have a greater interest in the world around him. His sense of hearing should be more accurate and more discriminative.

Objectives

1. To bring children to a better understanding of nature through the sound and music of nature.

2. To provide a means for creative expression.

3. To help children to better appreciate nature.

4. To provide a climate of learning through nature.

5. To create a base for a life of creative living.

6. To provide a worthwhile use of leisure time.

7. To provide experiences for individual learning.

8. To provide experiences for group learning.

9. To gain personal satisfaction in seeing application of knowledge.

10. To gain inspiration through the beauty of nature and music.

11. To show the direct relationship between nature and the inspired creation of music.

12. To provide for cultural experiences within the process of education.

13. To give students the opportunity for personal involvement in music and self-expression and identification.

14. To provide activities for the enjoyment and appreciation.

Songs Of All Time

Sing a Tune
Fienlandia
He's Got the Whole World
How Beautiful Is Thy Green Earth
The Climate
When a Breezy Morning
Hiking Song
Hark to the Chimes
Who Stole My Chickens
Peace Peace Peace

Work and Sing

Golden Slumber
Home On the Range
Shennadoah
Comin Round the Mountain
Swing Low Sweet Chariot

Tent and Trail Songs

Rise and Shine
America
Battle Hymn of the Republic
For Sun and Rain
Praise for Bread
Lord for Thy Daily Food
Father give This food Thy Blessing
Black Eyed Susan
Whether the Weather
Long John
Dise Bones Gonna Rise Again
Long Legged Sailor

Concepts (Folk Music)

1. Learning about the music of the American Indian.

2. Appreciating the American heritage of music.

3. Interrelating the music of the Indian with the music of nature.

4. From a basic knowledge of Indian folk music, proceeding to more modern American Folk Music.

5. Studying folk music of other countries.

6. Singing and recognizing folk tunes.

7. Creating body movement to music.

General Procedure

Pre-Camp

1. From the pamphlet by Scott Stringhan, pages 4-7 give a lecture on the basic facts of American Indian Folk Music.

Camp

1. From study of the Indian folk music, let students sing Foreign American folk tunes.

Post - Camp

1. To learn to play the flutes and drums similar to the Indians.

Materials

Record Player, records, flutes,drums, songbooks, one gallon tin can and inner tubes string.

Investigation

Pre-Camp

1. Discuss the vocal and instrumental uses of music by the Indians.

2. Listen to recordings of Indian Music.

Camp

1. Students will sing typical Foreign American Folk tunes.

2. Students will note that problems and feelings of people all over the world are basic as expressed in the folk music from various countries.

Post-Camp

1. Students will construct drums and rattles similar to those used by the Indians.

2. Flutophones and drums will be played by all students until they have learned to play simple tunes.

Extension (Folk Music)

Pre-Camp

1. Act out some of the dances to the recordings.

2. Note the use of rhythm.

3. Discuss the close relation of the purposes of Indian folk music to nature, such as rain dances.

Camp

1. Students will make up dances to accompany their favorite folk songs.

Post-Camp

1. Students will make up a folk song based on an experience from camp. This song should be accompanied by the flutes and drums or guitar.

Books:

Densmore, Frances
The American Indians and Their Music
Whiteside, Inc. 1936 New York
Buttree, Julia M.
The Rhythm of the Redman
New York, A.S. Barnes & Co; 1930

CA Music - Folk Music of the World by Scott Stringham

Music in Our Life - Silver Burdette; 1959

Nettl, Bruno

Folk and Traditional Music of the Western Continents

Englewood Cliffs, New Jersey, Prentice-Hall, Inc; 1965

Singing Every Day - Ginn; 1950 p.55

Outcomes:

By beginning the study of folk music with the American Indian, the student should note the closeness of the music to nature. By studying American and other traditional music, the student should also recognize the development of music from its primitive stage.

The Music of Nature (Spring or Fall)

Concepts - The Music of Water (Rain, Brooks, Rivers, Oceans)

1. Develop the art of listening.
2. Develop the ability to compare.
3. Provide different ways of appreciating and understanding our environment.
4. Develop appreciation of music as a interpreter.
5. Develop ability to think and communicate.
6. Develop appreciation of the endowments of nature and the conservation of each.
7. Develop appreciation of music as an interpreter

General Procedure

Pre-Camp

1. Sing songs about water and rain (Familiar).
2. Discuss value of water in our daily lives.
3. Discuss what water has contributed to music and literature.

Camp

1. Use first hand experience-listening to Brook.
2. Discussion of effect of sounds on individual.
3. Sing Songs about water.
4. Discuss needs of water.

Post Camp

Listening Lesson (Appreciation)

1. Recordings - Beethovens Pastoral Symphony--Hyden-Water Music.
2. Describe the sounds of the music in comparison to the words of the writer.
3. Describe how camp life was enriched by presence of water.

Materials

Records - Handles Water Music, Beethovens, Pastoral Symphony

Song Books--Ginn Singing Juniors, Silver Burdett - Music in Our Times - Music in Our Lives, Prentice Hall - Time for Music

Investigation - Specific Procedure

Pre-Camp

1. Sing or play recordings of the following songs that you may know. A Flow Gently Sweet Afton, Old Man River, Flood Tide, Peace by the River, Santa Lucia, Roll on Columbia, Singing in the Rain, April Showers, September in the Rain, Bank of the Wabash etc.

2. Encourage children to comment on what the music means to them. An esthetic experience. Drowsy, angry, leppy, sad, astonishing, great terrible soothing content, etc.

3. Draw a picture of the scene that you see or describe it in words. (What the composer is trying to say.)

4. Use as many adjectives as you can to describe the picture.

5. Compare with the poet, who puts into words what he feels, with the composer who sets these things to music.

6. In words give an everyday realistic description of the value of water and what it means in your life.

7. List these uses on chalk board.

Camp

1. Take a walk in the rain. Describe how you felt and how do you think the plants and earth feel?

2. What is water and how much of it do we need? (Discussion)

3. What are the uses of water? (Discussion) What is clean water?

4. How do we waste our water? (Discussion)

5. Sing songs about water: Beautiful Ohio, Singing in the rain. From song sheets Cara Nina and My Bark Canoe. From Ginn Book 7

6. What do you do on a rainy day? (Discussion)

Post Camp

1. Listen to the records again. Study the lives of composers.

2. Discuss experiences that may have enriched background for information and appreciation of water.

3. Discuss whether or not the composer felt the same way about water that each of students do.

4. Why do we need clean water? (Discussion)

Extension

Pre-Camp

1. Examine Paintings of Water.

2. Discuss the composition of properties.

3. Discuss benefit to plant and animal life.

4. Discuss destructive powers of water.

5. Discuss conservation.

Camp

Post Camp

1. Does water have musical qualities rhythm? Pitch, Tonality

2. Review the water music.

3. Write a tone poem about water using such words as gurgle, bubble, running, calm, peaceful etc.

Evaluation and Addendum

Pre Camp

1. Why do we call certain music water music?

2. Do you think water is a good subject for music and poetry? If so why?

Camp

1. What causes the rhythmic movement of water?

2. What other natural things in our environment have rhythmetic movement?

Post Camp

Give a brief biography of the lives of the two important composers. Hyden and Beethoven

Reference

Records - Handles Water Music, Beethovens, Pastoral Symphony

Song Books - Ginn Singing Juniors, Silver Burdette, Music in Our Times

Music in Our Lives, Prentice Hall - Time for Music

Outcomes

Student should recognize the things in our natural environment that serve as inspiration to the great composers and writers. To help the student realize that to understand and discuss the ordinary things in life is the way to start educationally.

The Music of Nature

Concept - The Music of Spring

1. Spring is depicated by man as being the beginning of all things.

2. Spring is a time of renewal.

3. In Spring we mourn the death of Christ, but we rejcice because he has given us everlasting life.

4. Appreciation of the great works of composers.

5. To influence the thinking of students to the great and small events of life.

6. To make daily living more meaningful.

7. To understand the season and the changes they bring about in nature.

General Procedure

Pre-Camp

1. Listen to the recordings of The Creation by Hyden.

2. Study the text singing teen agers - Ginn & Co. P. 208

3. Sing other spring songs.

4. Discussion of pupil questions and inquiries etc.

Camp

1. Examine your natural surrondings for indications of renewal.

2. What has brought about the change? Discussion of scientific facts about the movement earth and relation to sun etc.

3. Sing the songs of spring from camp and from school text books.

4. What are some of the sounds of spring?

Post Camp

1. Study a scientific explanation for our seasons.

2. Discuss the beauty of nature - How can tell it is a time of renewal.

3. Sing Spring Music.

4. Play the recording of The Rite of Spring by Stravinsky.

Materials

Record Player and recordings, text books, camp song book

Investigation

Pre-Camp

1. Introduce the unit by playing "The Creation" by Hyden.

2. Have Students read and sing the parts from their text books.

3. Find out about the composer. Is most of his music so profound? (Play piano or use recording)

4. Does the music have rhythm, and balance, to the words detract from or give the music more meaning?

5. Discussion of movement, rhythm and plan of universe.

6. Sing other spring songs that describe every day activities and living conditions.

From Ginn & Co. 7 Green Grow the Lilacs P. 58 Song of the Morning P.267 Hail to the Month, White Coral Bells P. 217 Palm Branches P. 205 May Day Carol (Silver Burdett P. 37 Music in Our Times) Welcome Sweet Springtime Listening Waltz of the Flowers-from the Nut Cracker Suite. (Any others the teacher may prefer.)

Camp

1. Camp are Spring and Summer as to color, freshness, sound, activity, interest energy. Discuss reasons for each.

2. Look for indications of renewal. (a) Young birds or eggs in nests. (b) Plenty of water in stream. (c) New Plants etc. (d) Spring rains cleanse the air and plants.

3. Sing the songs of spring from text and camp song book.

4. Write a poem about spring.

5. Set the poem to music.

Post Camp

1. Listen to Stravinsky's The Rite of Spring. (Recording)

2. Listen to Aaron Copelands "Appalachian Spring. (Recording)

3. Compare the two compositions. Discuss likeness and difference. Also describe what instruments play each part. Is there violence in nature in the spring? If so what? Do you hear violence in the music?

4. Sing the Spring Songs you have learned.

Extension (Spring)

Pre-Camp

Using Science text books and Encyclopedia review the motions of earth.

Camp

Notice time of sunrise and set in comparison to other seasons. Why are we more anxious to be up and out in the spring? (Discussion)

Post Camp

Study the instruments of the orchestra and what they portray in each composition.

Evaluation and Addeddum

Pre-Camp

1. Give a description of the effect of the earths movement upon climate and growth.

2. Why do we call Spring a time of renewal?

Camp

1. Compare the colors of spring with the colors of other seasons.

2. Compare the water of spring with the water of other seasons.

3. Compare the air we breath with the air of other seasons.

4. What is your favorite spring song? Why?

Post Camp

1. Discuss the lives of the three composers.

2. What characteristics do they have in common?

3. Which characteristics do you think have contributed the most toward their greatness?

References

1. Science text books.
2. Encyclopedia.
3. Music in Our Heritage - Silver Burdett
4. Singing Juniors - Ginn & Co.
5. Singing Teen Agers - Ginn & Co.
6. Music in Our Times - Silver Burdett
7. Music in Our Life.
8. Time for Music - Prentice Hall.
9. Music for Everyone - Prentice Hall

Recordings

The Creation by Handel

Appalachain Spring - Copeland

The Rite of Spring - Stravinsky

Waltz of the Flowers - Nut Cracker Suite

Outcome

1. He should be more aware of the phenamenon of nature. He should have greater understanding and a vocabulary with which to voice his understandings.

2. He should be forever aware of the music of nature and of the pictures this music portrays.

3. He should be able to listen to music and know what part each instrument is playing.

4. He should sing for pure enjoyment.

Concepts (Bird Songs)

1. Developing the art of listening.

2. Recognizing the sounds of birds.

3. Imitating the sounds of birds.

4. Communicating through music.

5. Understanding how nature can inspire people to write music.

General Procedure

Pre-Camp

1. Discuss the importance of listening for bird calls.

2. Study bird calls on record.

3. Discuss meaning of pitch and quickness of the call in comparison to man's voice and emotions.

Camp

1. Review the ten basic bird calls at beginning of week.

2. Sing songs about birds.

Post Camp

1. Listen to Stravinsky's Fire Suite and note the fact of its basis and similarity to the sound of birds.

Materials

Records, record player, bird whistles, staff paper, song books

Investigation (Specific Procedure)

Pre-Camp

1. Listen carefully to the individual bird calls on record.

2. Have the children whistle in imitation of ten of the calls.

3. Discuss the meaning of pitch and quickness of the calls. For example: quicker shriller tones have a different emphasis than low mellow calls.

4. Teach a song employing as many bird calls as possible in the melodic line.

Camp

1. Review the bird calls on record in preparation for listening throughout the week.

2. Sing songs about birds such as "Mockingbird Hill," "The Mocking Bird."

3. Listen for bird calls and note how many times specific calls are heard.

4. Listen for new bird calls.

Post-Camp

1. Listen to the "Fire Bird Suite."

2. Have students imagine what the sounds represent.

3. Note the fact that the music is based on sounds of nature.

Extension (Bird Songs)

Pre-Camp

1. Have the class study the rhythmic patterns of the calls they have learned.

Camp

1. Review the songs that employs the bird calls that was learned in class.

2. Make up songs using the bird calls the students already knew and including new ones heard at camp.

Post Camp

1. Study a brief biography of the composer, Stravinsky.

2. Note that the melody is polytonal tone as if the melodies of various bird calls had been put together in song.

3. Learn the story of "The Firebird Suite."

Evaluation and Addendum

Pre-Camp

1. Have the class identify the calls from the record or letting each student whistle a call for the group to identify.

Camp

1. Observe student's interested and participation in singing and imitating the bird calls.

2. Note any improvement in ability to recognize the calls as a result of experiences in camp.

Post Camp

1. As a follow up or evaluation of all three lessons students should be asked to give specific bird calls.

2. When rhythmic patterns are patted, students should also identify the particular call.

3. Quiz on Stravinsky's life.

4. Quiz on the story of "The Firebird Suite."

Reference

Singing and Rhyming --Ginn 1950 Third

A Bird Came -- p.123

The Woodpecker -- p.132

White Dove -- p. 123

Cheerio -- p. 124

Tra La La -- p. 124

Singing Every Day -- Ginn, 1950

A Little Green Bird -- p. 152

The Brown Bird -- p. 152

Fol - De - Nol -- p. 153

Music in Our Heritage - Silver Burdette, 1962

The Lonesome Dove -- p. 15

Igor Stravinsky -- p. 219

Music in Our Life - Silver Burdette, 1959

Igor Stravinsky

"The Firebird" "Dance of the Princesses"

Measures 17-32 p. 161

Record: The Firebird Suite Stravinsky

Record of Bird Calls

Outcomes

By studying the sounds of nature such as the music of birds, the students should realize the importance of nature as a source of inspination for the composition of music.

Physical Education and Recreation

Objective: Fun and Relaxation through exercises and rhythm.

Mehtod: Folk Games

Procedure

Introduce simple games such as "Hokey Pokey". Do not insist that everyone take part. Other simple folk games that could be used are: Pop Goes the Weasel, Working on the Railroad, Patty Cake Polka, Heel and Toe Polka, Seven Jumps, Captain Jinks, Hello and Goodby, and Oh Johnny.

Materials

Record player with microphone attached.

Appropriate record for each game to be taught.

Flat outdoor or indoor area large enough for group to form a single circle.

Preparation

Start with simple folk games and teach any skills necessary. Proceed to new games by reviewing those already learned and demonstrating skills necessary for new one.

Reference

A World of Fun, R. Harold Hipps and Wallace Chippece, General Board of Education, The Methodist Church.

Physical Education Curriculum Guide, West Virginia Department of Education.

Physical Education and Recreation

Objective: Quiet on Rainy Day Fun.

Method: Game Board Games

Procedure

Provide enough games so that all present may play if they wish, also see that there are benches, stools, and tables as playing surfaces.

Materials

Dominoes, Checkers, Chinese Checkers, Count and Capture, Chinese Friends.

Preparation

Have game boards available and rules posted where all may see. Be prepared to help with procedure of play and rules.

Reference

World Wide Games, Warren and Mary Lee Bailey.

Game Board Games and Puzzles, Albert Wyatt Hobb.

Objective: Physical Education and Recreation Shuffleboard

Procedure

Divide groups into teams of two each. Assign a scorekeeper to each group.

Materials

Eight disc (four red and four black). Four cues Court 52' X 6'.

Preparation

Discuss rules for play and sccring..

Reference

Physical Education Curriculum Guide, West Virginia Department of Education, p. 200.

Objective: Physical Education and Recreation Badminton

Procedure

The doubler game is played with two players on a team. Divide groups into teams and assign scorekeepers.

Materials

Court 17' X 44' single 20' X 44' double. Net-top of which is 5½' high. Racket for each player, Shuttlecock.

Preparation

Discuss rules of game and demonstrate skills necessary for play.

Reference

DGWS Badminton Guide

Physical Education Curriculum Guide, West Virginia Department of Education, p. 159.

Objective: Physical Education and Recreation Volleyball

Procedure

Players are divided into two teams of eight players each for each court available. If necessary adjust size of team to suit size of group.

Materials

Outdoor court 30' X 60', Standard 8', Net 32', Volleyball.

Preparations

Discuss basic rules. If necessary demonstrate skills to be used. Set net at a height of 6 feet to 6 inches.

Reference

DGWS Volleyball Rule Book.

Modified Rules or: Physical Education Curriculum Guide, West Virginia State Department of Education, p. 231.

Objective: Physical Education and Recreation Giant Volleyball

Procedure

Any number can play or at least 15 on each side. Same rules as volleyball except served ball may be relayed by two players and ball may be hit any number of times before being volleyed over the net.

Materials

Same court and net as regular volleyball. Cage ball 24 inches in diameter.

Preparations

Discuss exceptions to rules. Caution players not to try hitting the ball with one hand.

Reference

Physical Education Curriculum Guide, West Virginia Department of Education, p. 238.

Objective: Physical Education and Recreation Horseshoes

Procedure

Divide group into two teams of two players each for each court available.

Materials

Space for courts 30' X 6', Pegs, Several set of horseshoes.

Preparation

Discuss basic rules and emphasize safety.

Reference

Physical Education Curriculum Guide, West Virginia State Department of Education, p. 189

MUSEUM

Objectives:

1. To provide a display area for materials, models, dioramas, and equipment related to outdoor education in general and earth science in particular.

2. To develop for loan to schools displays, models, and items of an educational nature.

3. To provide an opportunity for pupils, while in residence, to learn to prepare materials for display.

(A) To learn how to prepare the items to be exhibited. (Models, plastomounts, molding, pottery, animal skins, taxidermy, etc.)

(B) To learn proper display needs and procedures. (Labeling and information of explanation.)

(C) To conduct research projects.

4. To provide opportunities of a similar nature. As in number 3 for pupils, not in residence, in the evenings and on weekends. (Polishing lenses, "rolling" stones.)

5. To provide for visitation by the public either as a guided tour or as a "browsing" opportunity for an individual to gain knowledge of displays.

MUSEUM

As a child grows older in age and experience, descriptions in terms that compare new things with other more familiar things become important in the learning process. But even adults learn most rapidly when they can see, hear and touch for themselves.

A school museum should be a place where children can explore with their fingers and see with their eyes the things about which they are studying. Suppose a child should drop an arrowhead on the floor; if its lasted four hundred years it will hardly break now. The important thing is to let him handle it and remind him that it was made by an Indian long ago who lived right here in his own neighborhood. History will suddenly become very real to him, as it will with many other objects you can provide for him.

Does a school system need a museum? If the children are there to learn, then the school needs every training aid it can afford in order to carry the subject matter to the child.

A person who plans a school museum should relate the museum collections to the units that the children study, making as many of them as possible that the children can handle. Some glass cases are useful, because they give the curator a chance to display some materials, with labels and pictures that help carry the story of the exhibit, such cases should be built so that the objects can easily be removed to pass around for inspection.

A lending or Suitecase department should be established to bring the natural sciences into the classroom. The lending collection should include such items as, rocks and minerals of West Virginia, plant specimen, mounted birds and mammals, fossils, insect collections, birds eggs and nests, American Indian life, tools, weapons and other native objects available.